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Gas Journal

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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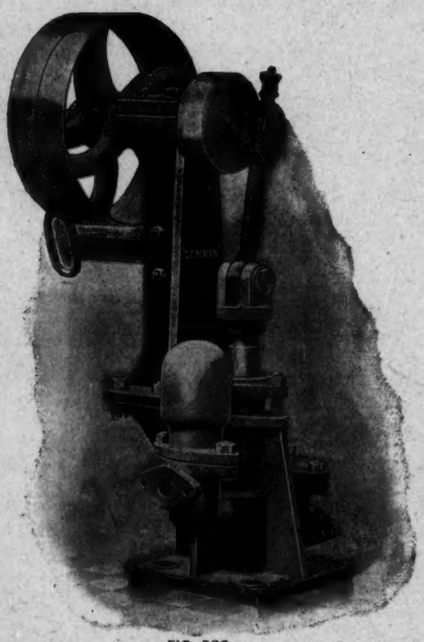

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXXXIX., No. 2833.] TUESDAY, AUGUST 28, 1917. [69TH YEAR.

EDITORIAL NOTES.

The Increased Tar Production Muddle.

THE gas profession appears to be in a most uncomfortable mess and state of perplexity and indecision regarding the request made by the Ministry of Munitions early this month for the carbonization of coal to be conducted to the fullest practicable extent instead of water-gas making, and in a manner that will ensure the maximum possible output of tar, in order to secure a larger supply of fuel oils. The favoured and recommended proposal to realize this was the adoption of lower carbonizing temperatures; and, in our first editorial last week, it was suggestively submitted that, *viâ* this route, the desired objective would never be reached, owing to the reduced aggregate tar production that the existing coal carbonizing plant, worked at lower temperatures and so having its capacity diminished, would yield, though per ton of coal carbonized at those temperatures there might be some increased production. It was further submitted that the lower temperature carbonization would affect the quality of the benzol and toluol for explosives making, besides involving a financial and a labour requirement which would put the idea outside the bounds of both feasibility and commonsense. It seems to be perfectly clear that confusion has arisen from ill-consideration; and it is not therefore surprising that a gas engineer of position should, through our "Correspondence" columns this week, urge the Executive Committee of the National Gas Council, with the gas engineers who have been co-opted for consultative purposes in connection with this matter, to furnish the gas profession at once with some light and leading as to what is the best course for them to pursue.

The war has proved that there is no more loyal industry than that devoted to gas supply. It has been asked to make many sacrifices. It has made them; and, in return, it has secured precious little help, consideration, and protection from the Government authorities. Reciprocity is a rare quantity in some quarters. However that may be, when the gas industry is asked to do something that very little consideration shows must negative the very result that is required, and bring other bad effects in its train, then it is time for pause and protest. Directly the new appeal was made, there were gas engineers who took for granted that they were at liberty to adopt any method they thought would conduce to the larger production of tar per ton, and would be compensated by the Ministry of Munitions for any expense and loss incurred. But when the cost of what was being done—the sacrifice for which compensation was hoped for—was seen, it was so startling that the National Gas Council had to appeal to gas engineers to "hold their hands," inasmuch as the Ministry of Munitions are not prepared to make monetary amends for loss unless their own Inspector approves of the proposals that are made, and unless they are accepted by the Ministry. Therefore, though the maximum possible production of fuel oils is essential, it must not be expected that there will be compensation for loss, unless what is specially done is sanctioned by the Ministry, who cannot be expected to pay an exorbitant sum for a possible lower aggregate output of tar. It would not be good business; but it appears that that is what the original suggestion actually amounts to. It seems pretty clear, too, that the best that can be done to increase the output of fuel oils, without injuring the quality of benzol and toluol for explosives making, is not to reduce carbonizing temperatures, but to maintain them, use the maximum retort capacity, and encourage householders and industries to consume as much gas as possible, so as to get to work any surplus coal-gas plant. This is a widely held view; and it has an obvious rationality about it as being the right course to pursue, and so to obviate, in addition, the waste of precious time in attempting to answer such questions as: "What is the estimated cost of making "the above quantity of gas [the gas produced by the works "in question] by reducing carbonization to 9000 c.ft. per "ton of coal?" This is a question that no gas engineer can answer without investigation and experiment with his plant and coal; and estimates that are pure guesswork might fall very wide of the line of accuracy—more especially when it is asked that the increased make of tar and coke per ton of coal carbonized should be credited to the lower temperature carbonization. Some engineers are estimating their losses, even if the lower temperature work could be continued, at anything between a few shillings up to ten shillings per ton of coal! The additional creosote oils obtained in this way would prove rather expensive.

Our "Correspondence" columns this week also contain a contribution from Mr. John West which incorporates some details which are as remarkable as they are enlightening not only in relation to this tar question, but in respect of low-temperature carbonization as a commercial proposition for the gas industry. It is gratifying to his friends to see the veteran gas engineer emerging from his partial retirement, and vigorously taking part in investigations the results of which have a large bearing upon problems associated with the greater advance of the gas industry in the service of community and industry. His data are convincing; and they give him complete warrant for taking a strong stand in this particular matter of high and low temperature carbonization for the production of tar in existing circumstances, and, for the matter of that, for any other purpose in which gas engineers are concerned—gas yield especially. But our immediate interest is with tar. There is a limit to the coal-gas retort plant possessed by all gas-works, which limit has been provided in compliance, using high temperatures, with the demands of the maximum demand season, which is now approaching. The figures which Mr. West presents to us (obtained from a seven months' research made under the conditions described in his letter, and with, so far, some 3000 tons of coal of different varieties) confirm in every particular the submission made in our editorial last week as to the lowering of temperatures reducing the coal-carbonizing capacity of the retort plant, and thus the total output of tar, and this very seriously. The gas industry has been invited to take a step in the dark; Mr. West illuminates the road along which it was proposed that the step should be taken. His figures will either have to be proved erroneous, or some substantial reason be advanced for perseverance with the low-temperature plan for enlarging the production of tar, before there can be insistence upon the adoption of the proposal anywhere.

Take one set of results—the retorts employed were the Glover-West vertical type—from a test with a poor quality of coal. At 2562° Fahr., 43·1 tons of coal were carbonized in four days; the yield of tar being 259 gallons. The temperature was then dropped 769° to 1793° Fahr., and the coal carbonized in four days was then only 12·97 tons, yielding 140 gallons of tar—a loss of 119 gallons, or 46 p.ct. But the production of tar (dehydrated) per ton of this "poor" coal with the high-temperature carbonization was only 6 gallons, while with the lower temperature work it was 10·8 gallons. Next take a good quality coal in another test. At a temperature of 2559° Fahr., 34·22 tons were carbonized; at a medium temperature, 2120° Fahr., in the same period, 17·73 tons were carbonized—a drop of close upon half. The yield of dehydrated tar per ton at the higher

temperature was 13 gallons; at the lower temperature, 16·5 gallons. But from the same retorts in the same length of time through the greater quantity of coal carbonized, no less than 447 gallons of tar were produced at the higher temperature, against 292 gallons at the lower temperature—a drop of no less than 155 gallons, or 34·7 p.ct. What is to be said of such figures as these, when the adoption of low temperatures is advocated for increasing the production of tar?

But Mr. West goes further, and supplies some information which corroborates that which we recently obtained from Mr. J. E. Blundell, of Macclesfield [see "Journal" for July 17], as to the results of steaming the charges. Two tests are given by Mr. West with temperatures a little over 2500° Fahr., in the first case without steam, and then with steam at the rear-end of the charge. A good quality coal was used; and the mouths will water of many engineers when they see that the make of gas is raised per ton of coal to 16,603 c.ft. (505 B.Th.U.) with steaming from 14,032 c.ft. (533 B.Th.U.) without steaming; while the production of tar from the quantity of coal used was raised to 640 gallons, or 20 gallons per ton, from 556 gallons, or 16·8 gallons per ton. This is an achievement for steaming that is fraught with much significance in our progress in economical gas manufacture. But the point of interest in connection with the subject specially under consideration is that the tar per ton, and that for the same total weight of coal carbonized in the same period, is so much increased—not by resort to low temperatures, but by steaming, with concomitant effects of a very valuable order.

Now in face of these figures, in face of the position of the gas industry in having to serve the Government in respect of not only fuel oils but benzol and toluol, in face of the requirements of the community and industries for gas and coke, fertilizers, &c., in face of the limitations of the coal-carbonizing plant and labour, it seems that in respect of the temperature-reducing proposition some one has blundered. We know the question of tar quality comes in; but if the much greater bulk of tar produced per unit of plant and in a given time using high-temperature carbonization is not better for the dual purpose of the Ministry of Munitions than the much smaller quantity, then it would be well to know the reason why. If a mistake has been made, then the sooner it is acknowledged and rectified the better, for many gas engineers are at the moment in a quandary. If it is tar quantity that is wanted, then they will work rather to get the largest bulk per day per retort than per ton of coal, which is a different matter—particularly in the final issue.

A Minimum Bonus and a Pension Scheme.

There are some people who think that the war is going to kill co-partnership as practised in the gas industry, owing to the temporary banishment in some cases of the bonus through the operation of war conditions. We hold that the intelligence—at any rate, in this matter—of those gas workers among whom co-partnership does not begin and end in bonus, but in whom the spirit and full intention of the system dwell, is greater than that of those who predict such a dire result. If we thought co-partnership only fitted in with the smooth times of peace, our interest in it would have a big fall. But what are the facts? The intelligent gas worker looks to his stockholding which has been brought into being by the system. That, he well knows, exists; it is something substantial, and cannot be extinguished. "What "has been in respect of its accumulation," he very wisely "argues, will again be when we have settled accounts with "the enemy." He looks at the amicable relations that have been, through co-partnership, engendered between directors, officers, and workmen generally; and he finds that these also continue to exist. And the fact that the concern in which he is a partner is ploughing through stress and storm only braces him up to do his best part to help to alleviate the difficulties. Duty with him is something with a solidity about it, and is not a hollow sham. We admit that all co-partners are not actuated by this spirit, nor do they all give evidence of co-partnership being with them a reality. But, very fortunately, they are not the whole number. The officers of every company in which the system exists are glad to acknowledge this. We ourselves have seen letters from co-partnership gas men at the front which prove that there is a genuine union between them and the company at home which has been formed and nurtured by the principles which underlie the co-partnership system. There is an actuality about all this; and the proof of it has been given by the test of an unpremeditated adversity.

At various meetings of gas companies recently—in connection with which companies the co-partnership bonus has been temporarily extinguished through the heavy rise that war conditions have compelled in the price of gas—proprietors have urged the Directors to consider whether something cannot be done to continue a distribution bonus—at any rate, in a small way—so that there may not be any interruption to the life and inspiration of the system. There are some co-partners who would regard this as an insult to their judgment and feeling as to what constitutes a contract and an obligation. On certain terms, they accepted co-partnership. To these terms, they say: "Let us "stand." That is the true co-partnership spirit. There are others who require the stimulant of a bonus. But some co-partnership companies whose war conditions have obliterated all financial margins and freedom of action would have to further raise the price of gas in order to give the co-partners a bonus outside the terms of the system; and the result of this would be that the slender dividends of the stockholders would undergo further diminution. Probably the well-intentioned stockholders have not thought of this. On the other hand, there are some stockholders who point to the fact that, though the co-partners' bonus has temporarily disappeared, the men still at work are receiving war bonus, and the dependants of the men at the front are having monetary assistance. We are not of those who hold that these payments are, or should be regarded as, any set-off to the loss of the co-partnership bonus. The payment to dependants is a humane obligation, which accentuates the bond existing between employers and employed. As to the war bonus, war conditions have brought grave hardship upon those of limited income, and have altered entirely their purchasing power. The craftsman and the labourer, and their wives and families, must be fed and clothed. The underfed craftsman or labourer would be of no use whatever to the employer; but the necessities of life cost more. This means that just as the higher expense of materials causes the cost of gas into the holders to be higher, so the heavier expense of food and clothing means that the cost of keeping fit and efficient has also gone up, and so therefore has the value of the labour rendered. In other words, to produce and maintain physical fitness costs more under war conditions than formerly; and so it must be paid for. This being so, we cannot recognize the war bonus as a counterpoise to the loss of the co-partnership bonus. The two things are widely separated.

However, whether or not a company can do anything to continue the co-partnership bonus must depend entirely upon its financial conditions in present circumstances. In some companies where the matter has been broached by stockholders, the chairmen have acknowledged that it may be that, just as in the case of the sliding-scale of prices and dividend, the basis of the co-partnership scheme requires modification, so as to fit it for exceptional times, and prevent a gap in the bonus distribution. The Directors of the Bournemouth and Croydon Gas Companies have found a simple way of dealing with the matter—by adopting the principle of a minimum bonus of 4 p.ct. at and above a certain price of gas. The matter was explained at the meetings last Friday of the proprietors—in the case of the Bournemouth Company by Mr. G. Crispe Whiteley, and in the case of the Croydon Company by Mr. Charles Hussey. Reports are published elsewhere in this issue; the fuller details being given in the Bournemouth proceedings. In this way, the Companies have averted the discontinuance of the bonus, and the method of doing it may be commended to the consideration of other companies who are discussing the question of modification. It is freely admitted by both the companies that theoretically the co-partnership agreement should stand, but that this is a case in which the extinction of the bonus, through the extraordinarily high price of gas, is not the product of normal movements such as were only in contemplation at the time of the framing of the terms of the co-partnership schemes, but of the abnormal circumstances of war, in the responsibility for which the employee co-partners had no part. This is a recognition that can also be applied to the position of the stockholders in respect of the sliding-scale of price and dividend. Both Companies have gone beyond this amendment of the terms of the co-partnership system, and have adopted in conjunction with it a definite pension scheme, which confers the right to a

certain pension, according to wages and length of service at a certain age, and part of the men's contribution to which is taken from the bonus. The men have through the co-partnership system been educated to keep an eye on the future; and the pension scheme, as an integral part of the co-partnership system, is something which has proved very acceptable to them. In this respect also, the general terms can be gathered from the report of the proceedings at the meeting of the Bournemouth Gas Company; and no doubt this publicity will prove suggestive in other cases in which a definite pension scheme does not already exist. We trace in the fundamental lines of these new co-partner pension schemes the plan that originated with (the late) Mr. Ebenezer Topley, as delineated by Mr. A. E. Broadberry, in his Presidential Address last June to the Institution of Gas Engineers. The scheme has been inaugurated at Tottenham; and at the last meeting of the proprietors of the Company, the Right Hon. Sir Daniel Goddard stated how the Directors had made a special grant to compensate for the two-thirds part of the men's contribution from the co-partnership bonus, which has fallen through owing to the temporary extinction of the bonus. With a minimum bonus, Bournemouth and Croydon will not have to make a special contribution in order to keep the pension scheme alive.

Rate-Aided Competition and Concerted Action.

Ever since the advent of public electricity supply, gas companies have suffered severely from rate-aided competition. But, at the present time, they are doing so in an intensely aggravated manner, and in circumstances that are unjust and disreputable to the administrators of the municipal electricity undertakings concerned. As we have said before, we say again that such trading can only justify municipal management by being conducted upon lines that make it innately financially sound. Aggravation of the injustice at the present time is found in the conditions that through the war obsess the gas industry. There are the depressing costs of coal delivered, the difficulties with and now suspension of oil supplies, the conditions of labour, the work that is being done for the Government for national purposes (which, while it should elevate the industry in the eyes of patriots, only tends in some areas to engender opprobrium, and a transfer of custom), and the control that is being exercised over the prices of, and dealings in, certain of the products of gas-works—on all of which fall the heavier obligations of the gas undertakings as tax and rate payers under war circumstances. There was a just cause of complaint in normal times over the running of competing electrical undertakings by local authorities in a way that brought upon the ratepayers generally—and weightily in the case of gas companies—the unjust obligation to discharge part of the cost of supplying electricity to those who require it. If unjust in normal times, what can be said of the present position, when additional war costs are in many cases being only partially placed upon electricity consumers, and, with shameless indifference, the balance is being levied from the ratepayers, who have already a big pack of war burdens to bear. The position is a monstrous one.

The objection of gas companies is the twofold one of having to work against rate-aided competition, and to share materially in that rate-aid to their own disadvantage—in other words, to help to finance their own competitors. The South Suburban Gas Company recently raised the question in connection with the Beckenham District Council electricity department. At the meeting of the proprietors of the Company, the Chairman (Mr. Charles Hunt) dealt with the matter, and allusion was made to it in our "Electricity "Supply Memoranda" last week. The protest of the Company led to the matter being referred to the Local Government Board, whose advice to the District Council was that the charges to the consumers should be raised, so that the electricity undertaking might be put into a position in which it could discharge its own proper obligations. The advice was not palatable to the Council. They prefer to continue what we regard as the immoral course of making up the difference between revenue and outgoings by appropriating money from the pockets of the heavily burdened ratepayers. Beckenham is not a solitary instance of this. There are many more examples. Hastings is one. Despite an increase of 20 p.c. for current, there has been a loss on the Corporation electricity undertaking for the past two years; and it will be remembered that this concern has had a particularly unsatisfactory history in the matter of finance as well as of other proceedings. A year ago the loss was £5786; and accounts recently presented to the Council show there is again a deficiency of £5291. We see that the Gas Company have increased their charge for gas right up to the standard—that is to say, by 35 p.c.; and even this is insufficient to meet the statutory dividends and other obligations, owing to the enormous increase in the cost of coal, other materials, labour, &c. What possible finesse can be brought to bear in arguing that equity is complied with by allowing a municipal trading undertaking to increase their charges by 20 p.ct. and draw the balance of deficiency from the pockets of the ratepayers, thus competing with a private concern that must considerably advance its prices to get any return at all upon its capital, and that return now, by legislative enactment, a greatly reduced one. The loss incurred by the electricity supply is simply launched upon the rates; and, though the ratepayers save something by the suspension of electric public lighting, they last year still contributed under this heading £732, or about four times as much as the charge made by the Gas Company for public lighting.

Calculating from the electricity accounts, the total average working cost per unit sold last year was 3·6d. For private purposes 785,084 units were disposed of, and of these 252,533 units were sold at less than the average working cost. The 20 p.ct. on the lighting flat-rate brings it practically to the maximum of 8d.; but there is no reason whatever why the charge for the lower priced units should not have been advanced all round, instead of coming under the general increase of 20 p.ct. If any argument can be brought to bear upon this suggestion, then it is that electricity cannot be generated and sold at a commercial price to-day in competition with other agents. Are the electricity suppliers prepared to admit this? The Hastings Electricity Department anyway would hardly care to stand responsible for such an admission. But there is still another course open; and it is that an appeal be made to the Board of Trade to increase the Provisional Order maximum price (it has been done in the case of certain other indigent concerns), so that more revenue can be drawn from the lighting consumers. Why not? If the metallic filament lamp is such a wonderful economizer over the old electric lighting conditions, then there is ample room for a still higher charge than was fixed in the carbon filament days. But when the accounts of the department were under discussion in the Council, not a word was said as to adopting any means to endeavour to make ends meet. The easy but crude and dishonest course of lumping the deficiency upon the ratepayers was the one that commended itself to the administrators of the civic affairs of Hastings. One councillor unblushingly acknowledged that the deficiency was £1000 less than was anticipated; and the matter of a big deficiency was one that was considered worthy of the commonplace joke, that "they were not calling upon "the ratepayers to pay any large excess profits tax." The Council are doing something infinitely worse.

The Committee who have in hand the management of this deficiency producing electricity undertaking are, we believe, the Committee who are, on behalf of the Council, and in conjunction with other corporations, energetically opposing the Gas Company's application for a Calorific Standard Order. This is heaping insult upon injury. The Board of Trade should note the fact, and particularly, too, the one that there is (so we understand) no hesitation on the part of this body to make use, in their opposition, of the present difficulties of the Gas Company—no matter the source of their origin, no matter whether through the war, or in the national service, they are unavoidable. It is quite possible that, through this service, the gas supply is not all it would otherwise be—especially with the increased demand for gas, and the suspension of the supplies of oil. And financial results in relation to the business done, despite the increase in the price of gas, are anything but gratifying. Yet, by force of the combined circumstances, many gas undertakings are being compelled to play right into the hands of rate-aided competitors. This is a serious matter; and we are afraid its full meaning and ultimate result are being lost sight of by many responsible gas men in these strenuous times when there is so much else to be done. Those who have not the same experience, either do not understand or do not care. Just by way of example, it may be mentioned that since 1915 the electricity consumers at Hastings have increased by 134, which indicates that many have been persuaded by the difficulties of the Gas Company, and the smaller percentage increased charge of the electricity supply, to transfer their

custom. If co-operation stands for something more substantial than concern only when self-interest is at stake, then it is the plain duty of those gas companies who are not adversely affected, to stand by those who are. This is essentially a matter upon which there should be concerted action. It has, we know, been mentioned at meetings of various gas organizations—the National Gas Council among them; but there it remains as negligible. Meanwhile, gas undertakings suffer. Connections are, let us repeat, being made because the percentage addition to electricity prices has been less through rate-aid than that which has had to be made in the case of company gas supply, and because interested parties have made it their business to put into circulation statements as to a depreciated gas quality. This is not a temporary matter; it will, the changes having been made, have permanent effect. The Local Government Board have told the Beckenham Council that, in their opinion, the proper thing for them to do, instead of putting their electricity deficiencies on the ratepayers, is to raise their charges. This step ought to be made compulsory; and if the maximum prices mentioned in the Provisional Orders are insufficient for current circumstances, then there should be a waiving of the maximum so long as conditions are opposed to an undertaking honestly paying its way. Gas companies should make a concerted move in this direction, and not leave derelict, to get on best as they may, those undertakings that are now feeling acutely, under war conditions, municipal electrical competition at non-paying prices.

Coal Control and Elasticity.

If there is one thing the Coal Controller never expected, it is that his coal distribution scheme would work without inflicting damage in some individual cases; and it is the aggregate beneficial result that weighs with him. But at the same time the scheme is not of a character that, when a good case is made out for not precisely complying with it, it should be inflexible, and an advantageous modification be refused. In our "Correspondence" columns last week, Mr. Henry Woodall showed conclusively that, in the case of the Aberystwyth Gas Company, of which he is the Chairman, a great deal of financial injury will be inflicted upon the town through the enforced alienation of the Company from the contracts they have made at Ruabon; and, moreover, an injury will be done—through the inferior quality of the South Wales coal which will supplant the supplies from North Wales—to the service which the Company are rendering to the Ministry of Munitions. For the maintenance of the gas supply, more of the inferior coal, more retort power, and more labour will be needed to compensate for the better material of which the Company are to be deprived. The Company have a genuinely good case. The Coal Controller, however, gets behind it by saying in effect that what is, through the transfer of the Aberystwyth gas-coal contracts saved to No. 6 area will to that extent obviate a corresponding tonnage of coal being brought to the district from Yorkshire (No. 5 area); and it is transport that has to take precedence of finance. But still Mr. Woodall maintains that special financial and other hardship should be taken into account. We see no reason why it should not be; but it is easy to discern the difficulty of the Coal Controller, in the matter of drawing the line in making concessions. Between him and those gas undertakings situated as that at Aberystwyth, we share our sympathy. It is impossible to severely take a side in this matter, although we do think that such an excellent case for relaxation as Mr. Woodall presents might receive the Coal Controller's favourable consideration. However, we hope that, before Sept. 8 arrives, the Aberystwyth Gas Company will have in store a good stock of the Ruabon coal.

The Search for Petroleum.

The Petroleum Supply Bill has come as a surprise to many people. They had probably heard of springs of natural gas having been discovered in this country, one of which was some time ago the nucleus of a promoting venture. But its lauded virtues live now—not in deeds, but only in the witching prospectuses which were launched upon a gullible public. There have also been occasional rumours that oil-bearing strata have been struck in this country; but so far rumour has not had material result. However, it is not likely that the Government would have promoted the Bill to empower the spending of money on the surveying and drilling of the country for natural oil supplies, unless they were of opinion that the search would not be fruitless. And, in this connection, the men whom Mr. Walter Long the other day said he had secured to help in this matter are not likely to allow the country's money to be frittered away uselessly. Prof. Cadman, for instance, has been making considerable study of the question not only at home but abroad. It will be remembered that less than a year ago Dr. William Forbes-Leslie stated, at the Royal Society of Arts, that England was not so entirely destitute of oil resources as many people supposed, and that in the near future the oil-fields of the Kimmeridge outcrop might be supplying much of the oil and petrol consumed in this country. He spoke of the presence in Norfolk of an oil-shale series of very considerable importance. An announcement has just been made, too, that at Huddersfield a well boring penetrated paraffin shales at a depth of 489 ft. and again at 700 ft. These pieces of intelligence, at all events, look promising; and with what is known now as to the probable workable duration of the American natural oil wells, it behoves our Government to see carefully that there is no neglect in ascertaining our own oil-producing capabilities.

The Government Proposals.

And the Government do not intend, if supplies are found, to have them exploited by company promoters, or for excessive personal profit. They are to be developed for national use, and on the most economical terms. That is the simple meaning of the Bill. By it, His Majesty the King is to have the exclusive right of searching and boring for and getting petroleum within the United Kingdom. If any person other than one acting on behalf of His Majesty, or holding a licence under the new measure for the purpose, gets petroleum in the United Kingdom, he is to forfeit a sum equal to three times the value of any petroleum gotten by him. That should be a good deterrent to surreptitious work, for which at the moment we do not see much opportunity. A Petroleum Royalties Fund is to be created, into which is to be paid, in respect of petroleum obtained on behalf of His Majesty, out of moneys provided by Parliament, and in respect of petroleum secured by a person holding a licence under the Act by the licensee, a sum equal to 9d. per ton of petroleum. Subject to expenses, the money is to be distributed among persons interested in the land from which the petroleum is drawn. The recompense does not strike one as erring on the side of liberality. The Board of Trade is the licensing department, and the one that will arrange terms and conditions. Nothing in the measure is to confer on His Majesty or any other person any right to enter on, or interfere with, land for the purpose of searching or boring for or getting petroleum which he does not enjoy apart from the Act. The expression "petroleum" is defined as meaning all petroleum and natural gas, and their relative hydrocarbons (excluding coal and bituminous shales), existing in their natural condition in the strata. It is not intended to adopt any spendthrift attitude in paying for natural gas; for "the sum payable into the petroleum royalties fund in respect of natural gas shall be a sum equal to 1d. for every 10,000 c.ft. of the gas computed on the basis of volume at the barometric pressure of 30 in. of mercury and a temperature of 60° Fahr." These primary provisions are dressed up in an amount of detail which it is unnecessary to notice here.

The Waste in Coal Adulteration.

There has been in the Technical Press a favourable acceptance of the Coal Controller's reorganization scheme to facilitate coal distribution and save unnecessary wagon haulage and all attendant expenses. In every quarter, the broad view is taken that this is a national question, and that the sum-total of national benefit will be worth having, though hanging on to the accumulated advantage there will be not a little individual disadvantage in respect of unaccustomed quality. But the war is giving users experience of extraordinary depreciation of quality; and, since "A. S. H.," in a "Communicated Article," and ourselves in an editorial article on June 19, called attention to the waste of locomotive power and wagon capacity and shipping and the uneconomy and inefficiency imposed on industry by the excessive dross content of coal to-day, men in other industries have also been pressing the point, until the Coal Controller himself, we believe, sees that there is more in it than at first met his eye, and desires to be informed of excesses and the offending collieries. Mr. Norton H. Humphrys has another interesting contribution

on the subject this week, supplementing the one that previously appeared. To "A. S. H.," however, belongs the original credit for calling attention to this matter from the carriage point of view, though others before him had voiced their feelings from the aspect of depreciated results on gas-works and in other heat processes.

Industrial Councils.

In the recently issued interim report of the Sub-Committee of the Reconstruction Committee on Relations between Employers and Employed, it was recommended that the Government should propose without delay to the various Associations of employers and employed the formation of Joint Standing Industrial Councils, in the several industries where they do not already exist, composed of representatives of employers and employed. The Ministry of Labour subsequently invited comment upon the proposals made in the report for dealing with industrial unrest; and a memorandum has been forwarded to us by the Director (Mr. R. T. Nugent) which represents the considered opinion on the subject of the Federation of British Industries—claimed to be by far the largest and most representative body of employers in the country. Mr. Nugent points out, also, that the memorandum is the first authoritative public pronouncement by employers on this important question. The Federation cordially welcome the views expressed by the Committee as to the important part which must be played by Associations in the settlement of the difficult questions which lie ahead, and express the opinion that it is, indeed, only by the establishment in each trade of organizations representative of employers and workpeople respectively, that the object can be achieved. While agreements in the fullest sense can only be made between organizations representing each side, it is, they say, almost impossible to provide security for such agreements if any appreciable portion of workpeople on the one side, or manufacturers on the other, are not members of their respective organizations, and are consequently not bound by the agreements. In the opinion of the Federation, this point is so important that they suggest that the Government ought to go far to recognize, and give an official standing to, organizations representative of employers and workpeople respectively, and to encourage the development of such organizations. At the same time, there should be no suggestion whatever of Government pressure or coercion—each trade being free to build up its own organization voluntarily, and on lines best suited to its peculiar needs. The idea of the Federation is that the basis of the scheme should be that each trade or section of an industry should form a council of masters and men, for discussing questions peculiar to the trade; but that there should also be superior bodies consisting (1) of representatives of employers and employed in each group of trades forming an industry, and (2) of representatives of the employers and employed in all industries.

Coal and Coke Exports.

It will be within recollection that the long unbroken war time record of monthly reduction in the quantity of coal, coke, and patent fuel exported was interrupted in June, when there were sent abroad some 162,113 tons in excess of June, 1916. But July has more than counterbalanced this; for the 3,395,365 tons exported in the month is less than in July last year by 178,772 tons, and 336,567 tons less than July, 1915. The value of the quantity exported last month was £4,600,344, which was more than in July, 1915, by no less a sum (though the quantity was lower last month by the figure already mentioned) than £1,358,693, but less than July last year by £224,608. At the same time, the average value per ton was £1 7s. 1d., compared with £1 6s. 8d. in July last year. In the seven months of this year, 22,856,736 tons have been sent abroad; or a reduction on the corresponding period of 1915 of 4,252,370 tons, and upon the same period of 1916 of 1,222,088 tons. For the 22,856,736 tons exported the last seven months, the value was £30,462,891; for the 27,109,106 tons exported in the corresponding period of 1915, £21,982,709; and for the 24,078,824 tons sent from these shores in the same period of 1916, £28,128,113.

Presentation to Mr. James Macleod.—On leaving Greenock (to take up his important position with Messrs. Brotherton & Co., at Glasgow), Mr. James Macleod was presented by the employees at the Inchgreen Gas-Works with a pair of silver candelabra, as proof of the high esteem in which he was held by the staff. Bailie Paterson, the Convener of the Gas Committee, made the presentation; and the opportunity was taken to introduce the newly-appointed Engineer and Manager, Mr. George Keillor.

PERSONAL.

The appointment of Manager of the Seaford Gas Company has been secured by Mr. A. W. GREY, who is at present Chief Assistant to Mr. Frank Livesey at Maidstone.

Mr. JAMES SIMPSON, J.P., the Chairman of the Hebden Bridge and Mytholmroyd Gas Board, has recently undergone a very trying experience, for a man within a little of completing three score years and ten. Last Tuesday he had an arm removed in the hope of stemming a growth. It is gratifying to learn that he is making good progress. Forty years ago he had a leg taken off under similar circumstances.

Mr. H. J. CARPENTER, the Assistant Engineer and Manager to the Doncaster Corporation Gas Department, has been appointed to a like position with the Peterborough Gas Company. He was for some years with the Harrow and Stanmore Gas Company, as Engineering and Works Assistant, previous to which he was with Messrs. Corbet Woodall & Son. He commenced his engineering training with Messrs. S. Cutler & Sons. Mr. Carpenter holds certificates in "Gas Manufacture" and "Gas Distribution" (First Class Honours), and in other engineering subjects.

A long first list was published as a supplement to the "London Gazette" on Friday of those who have been admitted by the King to the two new Orders—the British Empire and the Companions of Honour—instituted by His Majesty for the special purpose of recognizing services in connection with the war. In the Order of the British Empire, the first two classes will carry the honour of knighthood and the title of Dame in the case of men and women respectively. The Order of the Companions of Honour carries with it no title. This Order will be closely restricted in numbers; and it consists of but one class. In the first class of the British Empire Order—Knights Grand Cross of the British Empire—is included the name of Lord Moulton, K.C.B., F.R.S., Director-General of Explosive Supplies in the Ministry of Munitions, and President this year of the Institution of Gas Engineers. One of Knights Commander of the British Empire is Mr. Dugald Clerk, D.Sc. (a Past President of the Society of British Gas Industries), a member of the Panel of Board of Invention and Research, Admiralty, a member of the Ministry of Munitions Inventions Department, and a member of the Trench Warfare Advisory Panel; and another is Mr. Richard Threlfall, F.R.S., a member of the Advisory Council of Industrial and Scientific Research.

OBITUARY.

Mr. ANDREW NAPIER, who was for forty years Gas Manager at Crieff, N.B., died last Thursday morning at the Gas-Works House, Crieff. His son (Mr. J. W. Napier) is the Engineer and Manager of the Alloa Corporation Gas and Electricity Departments. The deceased gentleman was the Secretary of the West of Scotland Association of Gas Managers at the time of the amalgamation with the North British Association. The funeral was on Saturday afternoon at Crieff Cemetery.

Official notification has been received by Mr. Walter T. Layton, the Editor of the "Co-Partnership Journal of the South Metropolitan Gas Company," that his son, Rifleman ERIC WILLIAM LAYTON, 1/21st County of London Regiment, who had been reported missing since Sept. 15 last, must now be presumed to have been killed in action on that day. He was born at Bromsgrove in 1889, and since 1910 had been on the show-room staff of the South Metropolitan Gas Company. On the outbreak of the war, he was one of the first to respond to the country's call—joining the First Surrey Rifles in August, 1914.

Blackburn has suffered a great loss through the death, at Harrogate, last Tuesday, of the Mayor, Alderman ALFRED NUTTALL, J.P., who had been in failing health for some time past. He first entered public life in 1893, when just over 30 years of age; and in 1913 he was elected to the aldermanic bench. He rendered excellent service to the town by his membership of various committees; particular interest being taken by him in the Gas Committee, of which he was elected Chairman in November, 1914. To the work of this Committee, indeed, Alderman Nuttall devoted a great deal of time and energy; and under his chairmanship the whole undertaking has been reorganized. The officials keenly feel the loss that both they and the undertaking have sustained. Thoroughness was Alderman Nuttall's inspiring motive; and he was at all times very appreciative of the work of the staff of the department. Apart from his municipal interests, he exercised a guiding influence in connection with many local institutions and organizations.

Information has been received by Mr. Edward Pilbrow, of the Gas Light and Coke Company, of the death in action, on the 15th inst., of his second son, Private STANLEY EDWARD PILBROW, who, after taking part in several battles with the 16th Middlesex (Public Schools Battalion), transferred into the Royal Flying Corps as an observer. His last flight was one in which the British machines were greatly outnumbered; but in spite of the fact that he had been wounded, he still continued to stand by his gun, until he was hit again through the head, and instantaneously killed. The machine was riddled with bullets. Lieutenant G. M. Prynne, writing to Mrs. Pilbrow, remarks that "no one can say enough for

the bravery and splendid behaviour of Pilbrow," who on all occasions "proved himself one of the stoutest-hearted and best men we had." Up to the time of his death, he had the credit of bringing down four Hun machines. Had he lived, he would have been 26 years of age next month. Mr. Edward Pilbrow's eldest son, Lieutenant H. E. Pilbrow, R.F.C., is at present home on sick leave, having been invalided from France five months ago.

There passed away last Tuesday, at his residence near Wigan, at the age of fifty-one, Mr. Frank E. Moss, and the funeral took place on Saturday at the Orrell Congregational Church. He leaves a widow and son and daughter. Mr. William Batt, the Secretary of the Northern Star Lodge, No. 3053, sends the following kindly appreciation of the deceased: "W.Bro. Moss was Provincial Junior Grand Deacon for West Lancashire, having been invested as recently as June 4 at the Provincial Grand Lodge held at Preston. He was a member of the Northern Star Lodge; and at the funeral there was a very large gathering of his personal friends and Masonic brethren to pay their last respects to his memory. The late W.Bro. Moss had been associated with the coal industry all his life. He was a colliery proprietor as well as a colliery agent, having his offices at Wigan. He was a man of great and attractive personality, and was known to almost everyone in gas engineering and colliery circles in Lancashire, Yorkshire, and the Midlands. He was a man who entered into everything—whether associated with business, social, or masonic matters—with the greatest enthusiasm. The principles he professed, he lived up to; and they seemed to inspire every action of his daily life. He was a member of several Masonic Lodges in the Wigan district; and although not a founder of the Northern Star Lodge, he became a joining member on Feb. 24, 1905 (the first meeting after the Lodge was consecrated), since which time he has been one of its most active and loyal supporters. He was a man of strict integrity and high principles, and greatly beloved by a large circle of friends, by whom he will be greatly missed."

From an Old Manuscript Diary.

Reading the other day a manuscript diary written by one John Russell, an ancestor of his wife's, and a Writer to the Signet in Edinburgh, Mr. H. Percy Boulnois, M.Inst.C.E. (a former Deputy Chief Engineering Inspector to the Local Government Board) came across the appended interesting statement. As coal gas did not come into use till 1790, and this diary was written in 1749, he rightly believes the quotation will have interest for readers.

The coal mines at Whitehaven are very extraordinary. Some of the pits are 120 fathoms below the sea; damp air is very frequent there; and some very extraordinary explosions have happened by kindling this air within these few years. Mr. Carlisle Spalding, the overseer of the works (a very clever, ingenious gentleman) has contrived a method of carrying off the damp air by applying pipes to the places infected with that air, and carrying it up to the mouth of the pits, where it is set on fire and burns with a constant flame. When the flame is extinguished, the air that issues from the pipe feels cold. It is remarkable of the air that, though it is set on fire by flame, yet no sparks or heat without flame will kindle it. For this reason they have invented a method of striking light by a flint upon a steel wheel, which enables them to see to work in the places infected with this air. The air itself has no effect upon the men unless it happens to be kindled. Several experiments have been made on this air, which retains the same quality of kindling by flame when it is carried in a bladder to any distance. Mr. Spalding told me that he has often made the workers, after they have been some time in the places infected, blow into a bladder; and this air which was thus forced into the bladder from their lungs has the same quality as the other, and may be kindled by flame. This experiment has always succeeded as often as it has been tried; and it is remarkable that the air issuing from the men's lungs does not acquire the inflaming quality till the men are about an hour and a half in the place infected with the damp air, which makes it probable that it has some effect on the men's bodies, though it is unperceivable. When the air becomes unfit for breathing in, the flint gives no light, but the sparks fall from the wheel in a reddish colour, and extinguish without showing light. Lord Dalmeny, late Sir James Clerk, Thomas Miller, Lord Justice Clerk and his brother George, John Maxwell of Williamwood, and I were three hours in traversing the works below ground with Mr. Spalding.

"King's Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas" records Mr. Thomas Shirley's observations in the year 1659 of "a well and earth in Lancashire taking fire by a candle approached to it," which was the first of many similar observations in England on carburetted hydrogen—"fire damp" as it is called by the miners—a gas of nearly the same kind as that (in its crude form) now commonly employed for lighting, heating, and power.

A Munitions Council.—It has been officially announced that, owing to the great increase in the staff and duties of the Ministry of Munitions, a "Munitions Council" will be established to ensure closer organization and the employment of more economical methods in the work of the Department. The Council will consist of the Minister of Munitions, the two Parliamentary Secretaries to the Ministry, and representatives of groups of other departments. The groups of Departments and representatives include the following: Engines, Sir Arthur Duckham, K.C.B.; Explosives Supply, Sir Keith Price; and Labour, Sir Stephenson Kent, K.C.B.

MONAZITE SAND IN CEYLON.

Work of the Imperial Institute.

The mineral survey now being conducted in Ceylon in co-operation with the Imperial Institute has, we are officially informed, led to the discovery of beach deposits of monazite sand, which will usefully supplement the commercial supplies of thoria required for the manufacture of incandescent gas-mantles. Samples of the sand have been investigated by the Imperial Institute; and the results are so promising that the Government of Ceylon has arranged to work the deposits. Suitable British concentrating machinery has been selected by the Institute for the purpose—after some experimental trials, and will shortly be shipped to the colony.

This is the latest chapter in the story of the long struggle to rescue the gas-mantle industry from German domination. Formerly, as is well known, the monazite deposits in Brazil were the only commercial source of supply of thoria; and these were controlled by the German Thorium Syndicate. The Brazilian monopoly enjoyed by the Syndicate was broken by the discovery of extensive deposits of monazite in the native State of Travancore in India, so rich that samples examined by the Imperial Institute were found to contain nearly twice as much thoria as the Brazilian monazite. The German Syndicate, however, obtained control of the Company formed to work the Indian deposits; and they continued to exercise a dominating influence over the industry till the outbreak of the war. Since then the Company has been reconstructed and given a British character; and it is understood that another portion of the deposits in Travancore has been taken up and will be worked by a second British Company.

It is of interest to note that the work of the mineral survey has shown that Ceylon can furnish several other thoria minerals besides monazite. Among these is thorianite—the richest known source of thoria. This new mineral when it first came on the market was sold in this country at as high a rate as £1600 per ton; but the deposits have proved to be limited.

ELECTRICITY SUPPLY MEMORANDA.

Interlinking.

While the Board of Trade Electric Power Supply Committee are sitting, the second report of the Committee for the interlinking of Lancashire and Cheshire electricity systems (of which Committee Mr. S. L. Pearce, of Manchester, is Chairman) has been issued. The first report appeared last autumn. The present one goes in detail into the scheme then presented; and it evidences very careful thought and preparation, which is no guarantee that it will be acceptable to all the undertakings concerned, nor that it will fit in with the views of the Board of Trade Committee, whose hybrid composition has already been brought into disparaging contrast with this technical Committee dealing with Lancashire and Cheshire. The fundamental principle adopted by the Committee is that interconnection of existing interests is the first step that should be taken in electrical reorganization with the view of obtaining an adequate, cheap, and reliable supply of electrical energy for industrial and other purposes. In view of the immense capital expenditure involved in the existing concerns, this appears to be an eminently sage course. The report is of considerable length; and it does not graciously yield to brief review. However, regarding the construction of the proposed Joint Board, the Committee suggest that every authorized distributor (there are in all 35 concerned) should be entitled to representation upon the Joint Board; so that the total membership would be 90, subject to extension by the advent of other eligible undertakings. In the case of local authorities, the basis of representation, it is thought, should be population of the area supplied; in the case of companies, capital outlay should be the basis. From the Joint Board, District Boards should be elected; and from these a Central Executive of twenty members. As to the powers of the Joint Board, it is suggested that they should co-ordinate and prescribe the running hours of the existing generating stations in such a way as to yield the most economical operating conditions; should also determine the bases of charges for bulk, stand-by, emergency, and reciprocal supplies—a complicated problem upon which the Committee give some indication as to their views; should deal with and allocate charges incurred in carrying out the schemes, together with the Board's administrative expenses; and should act in an advisory capacity in reference to future extensions, linking-up, &c. Other suggestions deal with the working arrangements between power companies and others, the appointment of officials, the investing of the Joint Board with compulsory authority to obtain wayleaves for mains and overhead lines, to lay mains in undedicated streets, and to erect overhead lines crossing public roads. Among other proposals, it is seen that, in the event of it being shown to the satisfaction of the Joint Board that any undertaking has been adversely affected financially by the operation of the above powers, it shall be incumbent upon the Board to allocate the charges between the participating authorities so as to reimburse the undertaking affected. The report proceeds to deal with the delegation of powers to District Boards and Executive Committee. Should

any dispute arise between any undertaking and the District Board or between a District Board and the Joint Board, the matter, it is suggested, should be referred to the proper Government tribunal for a decision. The scheme is a far-reaching one; the duties and work involved are of a complex order; the seats for dispute and disaffection many; and, if consummated, it would be a remarkable thing if the Government tribunal to whom disputes would have to be submitted were not kept busy, in view of hitherto free local administration being brought largely under the subjection of an external body in the manner proposed.

Requisite Cooker Maintenance.

The Electric Lighting Committee of the Marylebone Borough Council regard a communication they have received as a great compliment. So do we—to the circumspection of their technical staff. The communication was from Messrs. J. Heywood & Sons; and it expressed "their appreciation of the services rendered by the sales department in maintaining the cooking apparatus for supplying the school and the men of the Royal Flying Corps at the Polytechnic in such a high state of efficiency, and thereby enabling the management to fulfil its obligations." From this it appears clear that had not this earnest and close attention to the maintenance of the electric cooking appliances been given, the firm would not have been able to fulfil their obligations. This demand for constant nursing is peculiar to the electrical type of cooking apparatus, and more especially to that of large capacity. The smaller representatives also beg for a fair amount of consideration; and, though accorded, many users have been mightily glad when they could root out their error, and welcome the superseding gas-stove. The Marylebone Electricity Department was one of the first to see the wisdom of endeavouring to keep electric-cooking appliances in order by frequent inspection and prompt repairing measures, which policy tells of a marked tendency to go astray, and to produce disaster.

Electricity at "Economy" Hall.

But we must give the Marylebone Electricity Department credit for showing a large amount of enterprise in connection with this subject of electric cooking. Whether the enterprise has always been directly profitable to the department one does not know; but whatever has been taken in hand has been a good advertisement, if nothing else. At No. 316, Regent Street, is "Economy Hall." It used some years ago to be the famous Russell Club. But now the premises have been acquired by the British College of Cookery and Domestic Economy. The school is said to be managed by an Advisory Committee, of which the Right Hon. Lord Leigh is the Chairman. We cannot recollect that it has ever been brought to our notice that the noble Lord has any particular qualifications for being Chairman of an Advisory Committee for a "College of Cookery and Domestic Economy." And we have not the slightest doubt that the principal of the College, Miss Matilda Lees-Dods, could give his Lordship a great deal more advice on the subjects than his Lordship is able to dispense. But let that pass for the moment. The college is within the district of the Marylebone Borough Council Electricity Department; and the direct current mains of the concern are delivering energy to the college for cooking purposes. It seems, according to the "Electrical Times," that the Committee, "realizing that electric cooking would in the end become universal, decided to instal several electric cookers for a start." The "several" consists of two which have been connected-up, and two additional ones are on order. The fact that the Committee, with Lord Leigh at its head, have "realized that electric cooking would in the end become universal," shows the incompetence of the Committee for forming judgment on such a matter. The Committee should study the questions of fuel economy, thermal values, and other points upon which it may be concluded that Lord Leigh and his Committee associates require a little enlightenment, so as to put them in a better position to judge of the likelihood of the possible universality of electric cooking, and of it having any durable or large part in this direction in the world's progress in economy. Being on the mains of the Marylebone Electricity Department, we may be sure that all electrical expert attention required for keeping the cookers in repair, and (as far as possible) free from failure, will be expended upon them. It is hoped by our contemporary that the undertaking will prove a sound commercial success, in which connection we wonder how much per unit Marylebone is charging for the current used at the college, and whether any part of the cost of providing the supply will go down into the accounts of the publicity or sales developing department.

The "Gas Controller" the Enemy's Friend.

"Meteor" of the "Electrical Times" opened his mouth and swallowed in every particular the recent statement of the "Evening News" that the authorities had in mind the appointment of a Gas Controller. By the time "Meteor" had penned a paragraph on the subject, the singular statement had been made not in one paper, but in a number of "evening papers." Rumour has a knack of expanding hyperbolically; and it suits "Meteor's" book where gas is concerned. The authorities in Whitehall and elsewhere interested in the question of the maintenance of high explosives and fuel oils would probably, if it were worth while, and any real harm had been done, have been only too pleased to have made close inquiry as to the source of the information of our evening contemporary. To do anything to diminish the flow of materials essential to the war is something which "D.O.R.A." will not stand. However, our friend attributes to the Board of Trade the proposal to appoint a Gas Controller. The Board of Trade are likely to consult the Ministry of Munitions, the War Office, and the Admiralty before they did anything so rash as to attempt to diminish the consumption of gas in present circumstances. The Coal Controller is working hard to see that gas undertakings are supplied with coal, in order that there may not be a shortage of a single gallon of any liquid or other product required by our Army or Navy; and it is the patriotic duty of householders and manufacturers to use gas instead of solid fuel or other agents which do not contribute to war essentials. There may be pacifists and other conscientious objectors. "Meteor" points out that the pacifists are in a predicament. If they save coal or if they consume gas, they are assisting to win the war and defeat their German friends. Every consumer the electrical industry entices away from the gas industry at the present juncture is an assistance to the enemy; so that those electricity managers and salesmen responsible for such enticement are worse than the avowed pacifists. It is not a gas controller that is wanted, but an electricity controller; seeing that every unit of electricity consumed in this country, taking the average consumption of coal per unit, means an expenditure of about 67,500 B.Th.U. to obtain 3420 B.Th.U. And nothing in the way of high explosives, tar oils, or other useful things of which the enemy devoutly wishes we had not such a plentiful supply, helps to compensate for that deplorable waste of thermal energy.

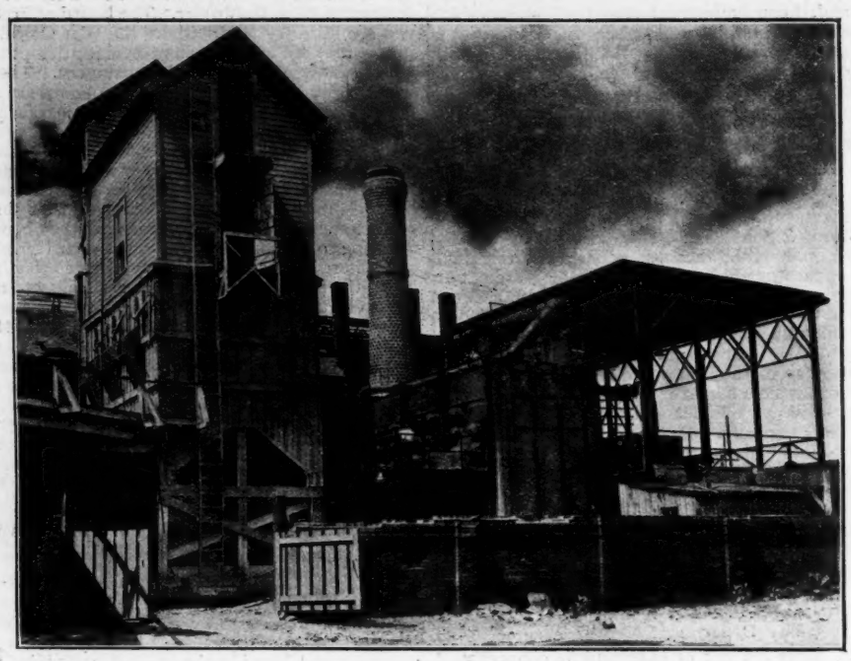
A Bye-Product Steam Boiler.

Mr. George Wilkinson, the Electrical Engineer of Harrogate, is desirous of removing this blemish of uneconomy from the working of electricity stations. He has a little scheme whereby he proposes to convert electricity stations into miniature gas-works, by distilling coal, washing the gas for the products, and economizing heat by discharging the incandescent coke and burning the washed gas under the boilers. It is a question whether a small carbonizing plant of the kind can be made to pay. Mr. E. W. L. Nicol not long since propounded a scheme whereby he proposed to place electricity generating plant at gas-works, where incandescent coke is available for steam raising, and the gas is washed of certain much-required products. However, Mr. Wilkinson convinced his Committee that his adaptation is a perfectly sound one—not that we suppose any of the members are really cognizant of the technics of coal carbonization, the chemical treatment of the products, and the raising of steam by incandescent coke and gas. Anyway, they sanctioned an application to the Local Government Board for £4710; and the Ministry of Munitions, it is said, pronounced it "an important advance on the present system." But they seem to have done this without seeing the plant in operation. Being wishful of inspecting it at work, so it is further stated, the Ministry have granted permission for the expenditure of an extra £1710 required to meet the proposed outlay of capital. That is to say, if we are to believe the newspaper report, the Ministry have pronounced judgment on the proposal before witnessing its operation. The local newspaper also states that just now the bye-products are especially valuable for the making of explosives. We do not think that the single boiler installation upon which, if the Local Government Board give their consent, Mr. Wilkinson is intending to spend the money mentioned will go far in supplementing the explosives required in the war. Their value to the extent of production will depend on the temperature of carbonization. It is also announced that the Board of Fuel Research are interesting themselves in the scheme. It may assist in convincing the Board that the question of electricity generation belongs to the larger one of fuel economy, with which is involved the cheapest method of carbonizing coal and dealing with and distributing the various products from the source of carbonization. Although gas-works have been doing for many decades much the same thing, only on a larger scale, as Mr. Wilkinson now proposes to do in the matter of coal carbonization, the realization of primary and secondary products, and the use of smokeless fuel under steam-boilers, the Harrogate paper applauds the scheme from the local and national point of view, and as an innovation. The innovation rather consists of adaptation to electricity generation; and it does not appear to be a very distant relation of the bye-product gas-producer. There is hope that the local baths and hotels with laundries attached will adopt the system. Mr. Wilkinson is obviously against the doctrine of economy in concentration; but then he has a smokeless combustion steam-boiler plant that he wishes (from, of course, purely disinterested motives) to see make its way in the world.

Evening Star Lodge.—This day forty years ago (on Aug. 28, 1877) the Evening Star Lodge, No. 1719, was consecrated at the Freemasons' Hall, London. All the founders of the lodge have since died; but twenty-two of those who have occupied the position of Master are still living. The name of one brother who joined during the first year—Bro. Samuel Cutler—is in the list of present subscribing members; while of those who were initiated the following year, there still remain Bro. T. H. Martin, formerly of Barnet, and Bro. John West.

AN OPEN CONSTRUCTION OF CARBONIZING PLANT AT MACON, U.S.A.

Suitable for Warm Climates.

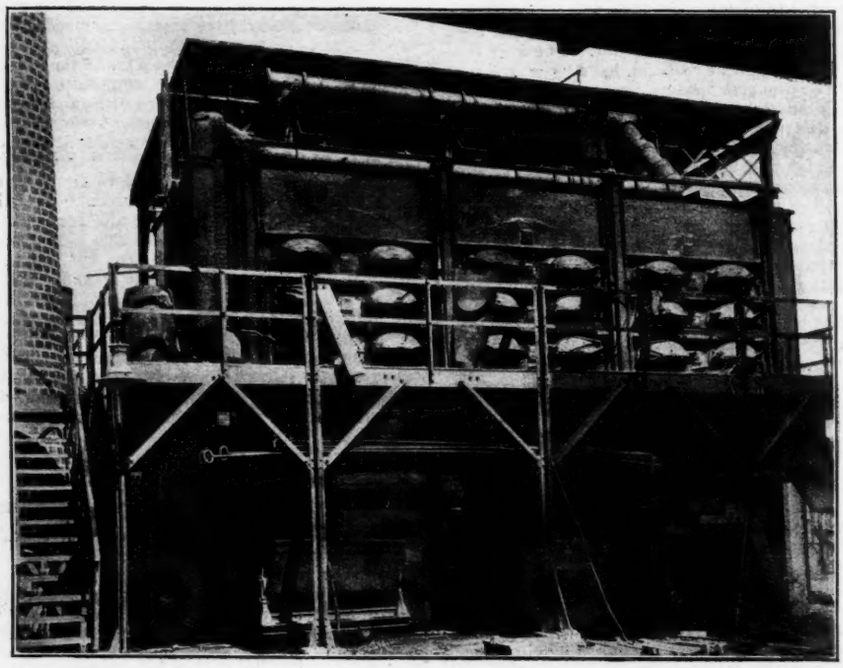


GENERAL VIEW OF THE NEW PLANT AT MACON.

A first installation of carbonizing plant erected at Macon (Ga.), and described in the New York "Gas Age," includes several novel features, the chief of which is the absence of a retort-house. The retort-bench, with its accessories, stands in the open; the only protection being a light roof carried on columns in the front, and covering the charging floor. The top of the bench is rendered rain-proof by a slab of reinforced concrete, sloping towards the discharge side, and carrying the usual guttering, &c. Three beds of sixes, with full-depth regenerator furnaces, are completed, and a similar bench is in progress.

The retorts are built in silica sections with fire-clay heads, and supported by silica setting blocks. The section is 16 in. × 26½ in., and the length 11 ft. 5 in., with mouthpieces at each end. The furnaces project 3 ft. 1 in. in front of the setting and carry large charging doors set in the floor. The recuperators are specially designed to ensure a good heat distribution. A tunnel flue in the foundation leads to a chimney at one end, and the primary air is injected by steam through a heating chamber in the rear of the furnace. The benches have Congdon stand-pipes and wash-boxes. There is a hand travelling pusher to eject the coke, a foul main, tar seprator, and coke conveying and screening plant.

Both the charging and discharging floors are supported on steel columns and girders, and are respectively constructed of reinforced concrete with a vitrified brick working surface, some 10 ft. above the yard level, and a cast-iron grating. The columns are encased in concrete up to the floor level. Charging and drawing is done by hand. Buggies are used for conveying coal; and the hand pusher travels on 7 in. girders spaced 8 ft. apart. The ram has a 15 ft. travel, is worked with a crank and gearing, and is much easier for the men than the usual process of drawing the charge. On the discharge side, a light shoot, built of steel slats, is fixed immediately beneath each column of mouthpieces, by which the coke is guided into side-tip trucks, 6 ft. × 3 ft. 10 in. × 4 ft. 8 in. high, running on a 2 ft. gauge rail system connected



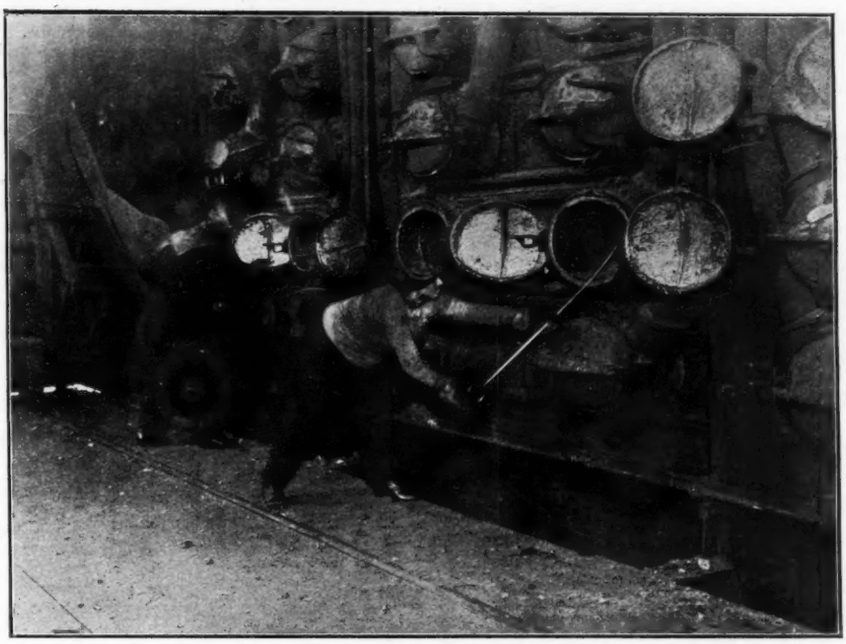
THE COKE-DISCHARGE SIDE OF THE OPEN-AIR RETORT-BENCHES AT MACON.

with the coke screen and tip. A water-spray over each shoot does the quenching, and water can be added to the car-load.

About 16 ft. from the discharge side is the coke screening tower, a wooden structure 12 ft. × 22 ft. × 42 ft. 4 in. high from the yard level to the ridge of the roof, connected to the stage floors by an overhead run-way. It contains a steam hydraulic elevator, with platform 6 ft. × 8 ft., on to which the trucks can be wheeled direct from the retort-bench, and either raised to a 12 ft. level connected with an elevated track leading to the coke tip, or to a 33 ft. level, where they can be emptied over the screen (which is a shaker), operated by a 7½ H.P. electric motor, and sorted into three sizes. They are delivered into a receiving bin built of 2 in. oak with two partitions, each compartment having two discharging gates with hinged spouts for loading wagons on the yard level, also a spout for loading into trucks on the elevated siding.

The Congdon stand-pipes are rectangular steel columns, two to each bed, each serving three retorts; and the mouthpiece connections are fitted with disc valves. They open at the top into steel wash-boxes, one to each bed, with adjustments for working either with no seal or any desired depth. The bottom ends are also open, and sealed in a tar-trough, into which the excess liquid from the wash-boxes also drains. The mixed liquids pass on to a separator tank fitted with baffle-plates. A 2½-in. centrifugal pump raises liquor from the wash-boxes to supply a spray that plays down each stand-pipe. Connections, 8 in. diameter, lead from each wash-box to a 12-in. foul main. This arrangement successfully avoids stand-pipe troubles.

WOMEN WORKERS OF THE SOUTH METROPOLITAN GAS COMPANY.



WOMEN AT THE VAUXHALL WORKS CLEARING RETORT-LIDS AND ASCENSION PIPES.

In the course of his remarks when presiding at the recent half-yearly meeting of the South Metropolitan Gas Company, Mr. Charles Carpenter, D.Sc., referred to the enormous help which women have been to them in their present difficulties, and stated that the retort-house work in a portion of one of the Company's large stations is now being carried out entirely by female labour. The Chairman's warm tribute to the zeal and earnestness displayed by the women lends special interest to the accompanying photographs, which he has since forwarded. These were, he points out, taken by flash-light; and consequently, though they may not be good pictures, they are accurate representations.

GIRL CLEARING AN ASCENSION PIPE.

GIRL BACKING-UP A RETORT, AFTER THE COAL HAS BEEN CHARGED.

The copyright in the above photographs [which are the work of the Sport and General Press Agency, Ltd.] is retained by the South Metropolitan Gas Company.

THE "DIRECT" PROCESS FOR THE MANUFACTURE OF SULPHATE OF AMMONIA.

From the Annual Report of Mr. W. S. Curphey, the Chief Alkali Inspector.

The following portion concludes the section of the report for 1916 of Mr. W. S. Curphey, the Chief Inspector under the Alkali Works Regulation Act, 1906, which deals with the further study of the "direct" process for sulphate making in gas-works. The earlier parts will be found in the last two issues of the "JOURNAL" [pp. 281, 322].

WORKS "G."

During the past year, plant has been under close observation, and Mr. C. A. W. Codgbrook, the Manager, has been most assiduous in his endeavour to perfect its working, to obviate loss of ammonia, and collect reliable data for the use of the Department. Attention at these works has been directed more particularly to improve the working of the "bubbler," and to the control of the rotary washer which supplies ammonia to the purifiers. In addition, the purifiers have been cased from the weather, provided with temperature tubes, and their working controlled by means of thermometers.

The earlier history of the works was given in the report for 1915.

Description of Plant.

Coal.—South Yorkshire, screened nuts:
Maximum average coal used per 24 hours, December, 1916, 13 tons.
Minimum average coal used per 24 hours, July, 1916, 6½ tons.

Gas.—Maximum average make, 150,000 c.ft. per 24 hours.
Minimum average make, 75,000 c.ft. per 24 hours.
} About 11,500 c.ft. per ton.

Purifiers.—Four, each 12 ft. square, with three layers of oxide, 7 in. deep.
Area of each purifier, 144 sq. ft.
Total volume of oxide (four purifiers), 1008 c ft.
Volume of gas passed per 24 hours per square foot superficies:
Maximum make, 1040 c.ft. (1250 c.ft. on Dec. 22, 1916).
Minimum make, 520 c.ft.
Volume of oxide per 1000 c.ft. of gas passed per 24 hours:
Maximum make, 6 7 c.ft. (5·6 on Dec. 22, 1916).
Minimum make, 13·5 c.ft.

The purifiers are in the open, and much exposed. They are placed in a shallow pit, with two grids above, and one grid below the ground level. The lower portion, with the connecting mains, is reached by raising the plank flooring at the side. The boxes are worked in sequence with upward flow of gas, and the first box is emptied when a foul test is obtained at the exit of the second.

Oxide.—Artificial oxide and bog ore were in alternate use up to December, 1916, when the material was fully spent. A supply of fresh bog ore (56 p.ct. moisture) was then obtained, and brought into immediate use with half its weight of spent oxide. Revivification is carried out on the floor of a shed. When first visited, in January, 1916, the shed was open at the sides, and the oxide much exposed to driving rain. In the spring, the sides of the shed on the north and west were boarded in, with great benefit to the oxide.

Acid Bubbler.—This is 4 ft. square by 4 ft. high, with the usual effluent tank and lead box for the circulation of liquor. The "bubbler" also receives ammonia from an intermittent still fed with virgin liquor.

Rotary Washer.—Of the Holmes type, with eight compartments, 4 ft. diameter, total working capacity 325 gallons. The washer is fed with ammoniacal liquor. In November, 1916, the liquor in the last four sections of the rotary was replaced by "Solvene" for the removal of naphthalene, which became a source of trouble as soon as the Livesey tar-extractor was put into operation for the extraction of toluol. The coal gas, after leaving the rotary, passes by an underground main (12 yards) to the purifiers.

Virgin Liquor Still.—Of intermittent type. The lower compartment of the still is charged with milk-of-lime. Liquor is then run down the still and the mixture is steamed to expel the "fixed" ammonia.

Working of Plant.

As originally worked, this plant had certain defects which seriously minimized its efficiency. Virgin liquor was distilled from store at maximum speed during the day time, and the hot ammoniacal vapours, imperfectly cooled by the Liebig, overpowered the acid liquor in the bubbler, and the effluent on occasions was alkaline, while the heavier liquor below remained highly charged with acid in spite of continuous and active circulation. This unfortunate condition of things was aggravated by the procedure, then adopted here as at several other works, of continuing the still in operation when the acidity of the liquor was at a minimum just prior to removal for evaporation. Under these conditions, the coal gas left the bubbler at a high temperature, heavily charged with moisture, and with amounts of ammonia varying from 6 to 140 grains per 100 c.ft. (Table C). The effect on the purifiers was disastrous—periods of disorganization were frequent, and the oxide was reduced to mud.

To remedy this state of affairs, the Holmes washer was brought into use. The first effect was unfortunate—a large part of the ammonia that formerly passed the bubbler and helped to counteract the evil effect of the moisture in the purifiers was absorbed in the washer and returned to the virgin liquor well. Attention was thereupon directed to the oxide. The sides of the revivifying shed were boarded-in and the floor drained. With drier oxide, conditions improved; and with the lessened make of gas and warmer weather the amount of gas passed rose from under 1 million to over 3½ million cubic feet, with the ammonia contents of the gas at a minimum—and this with oxide fully spent.

It was clear, however, that, with the approach of winter, purifier troubles would recur as soon as the new stock of wet oxide was brought into use. Steps were therefore at once taken to amend the defective working of the plant. The ideal aimed at was to regulate the flow of liquor to the still and to adjust the milk-of-lime feed by test; to ensure complete absorption of ammonia in the "bubbler" under all conditions of work, and to add a controlled amount of ammonia at the rotary; to screen the purifiers from the cold and regulate their temperature by means of steam pipes placed below the bottom grids; and, lastly, to reduce the moisture content of the oxide to a minimum. The working of the plant was successfully remodelled; but in spite of every effort, the ill-effects due to the use of fresh wet oxide, though lessened, could not be obviated. Relief was only finally obtained by bringing into use some old and partially spent bog ore (30 p.ct. sulphur) that remained on the works. It is of the utmost significance that with this drier and matured material, and with the improved system of working, the amount of gas passed rose from 470,000 c.ft. (Experiment No. III., Table D) to nearly 4½ million cubic feet (Experiment No. IV.) under the worst possible climatic conditions and with a winter make of gas. The matter is further discussed below.

Working of the Plant in Detail.

Virgin Liquor Still.—Test of the effluent liquor showed that on occasions serious loss of "free" and "fixed" ammonia was taking place; the still was overtaxed and milk-of-lime added with little regard to the volume of liquor charged, thus: Virgin Liquor Feed.—"Free" ammonia, 1·040; "fixed," 0 880; total, 1·920. Effluent Spent Liquor.—"Free" ammonia, 0·066; "fixed," 0·330; total, ·396.

A loss of 20 p.ct., equivalent to 3 lbs., of sulphate of ammonia per ton of coal carbonized.

With increased lime-feed and more careful steaming: The effluent spent liquor showed "free," 0·046; "fixed," 0·003; total, 0·049—a loss of 2½ p.ct., equivalent to ½ lb. of sulphate of ammonia per ton of coal.

It was then decided to charge the still periodically with the same volume of liquor and to add a fixed charge of milk-of-lime; to work the top section* of the still hot; and to increase the flow of water on the Liebig. The altered procedure was entirely successful. In place of 17 to 20 gallons of liquor per 70 minutes, 25 gallons were distilled, and loss of ammonia in the spent liquor was minimized. But the improvement was only made possible by consequential changes in the "bubbler." To cope with the extra volume of ammonia from the still, it was necessary to secure partial or complete saturation of the ammoniacal condensate from the Liebig; otherwise the effluent bubbler liquor would have been alkaline under all conditions of work. This was effected by means of a small preliminary "neutralizing box" placed in the acid liquor circuit; the ammoniacal condensate and uncondensed gases being passed through this box with the acid liquor before entering the "bubbler." Complete neutralization was in this way effected in a very simple manner and at minimum cost, as all the parts were made and fixed by local labour. The arrangements are shown diagrammatically in figs. 1 and 2.

In fig. 1, A is the neutralizing box—a lead-lined wooden box, 1 ft. square by 18 in. high. B is the usual iron seal-pot receiving ammonia gas and condensed liquor from the Liebig C. D is the usual lead box for circulating acid liquor from the bottom of the "bubbler" E, raised 2 ft. and connected with A by 1-in. pipe sealed in liquor below. From the neutralizing box A, the mixed ammoniacal and acid liquors enter the "bubbler" by the usual pipe (*a*) sealed below and uncondensed gas by the usual unsealed pipe (*b*). The pipe F delivers strong sulphuric acid direct from an overhead tank to the last compartment of the effluent liquor tank, in place of to the lead box as formerly. It is now proposed to replace the lead neutralizing box by a small cylindrical cast-iron seal pot lined with lead—one similar to the seal pot B would doubtless suffice.

Fig. 2 shows the arrangement for feeding the still with a fixed volume of liquor. A is the store-tank; B, the 25-gallon measuring tank; C, a glass gauge tube with anti-splash funnel; a a^1 are cocks—the former full open, the latter set to standard; b b^1 are lever taps—b fills the tank, b^1 empties it; the height of liquor h^1

* If the flow of water on the Liebig be unduly increased and the top of the still worked cold, ammonium carbonate is apt to condense in the iron seal pot and block it. With the top section kept hot, this source of trouble disappeared.

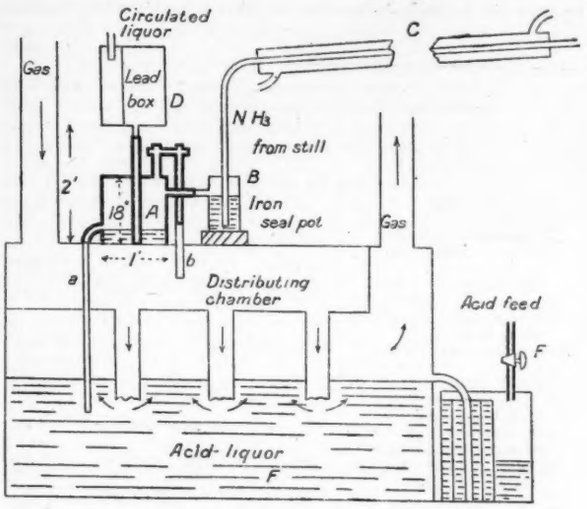
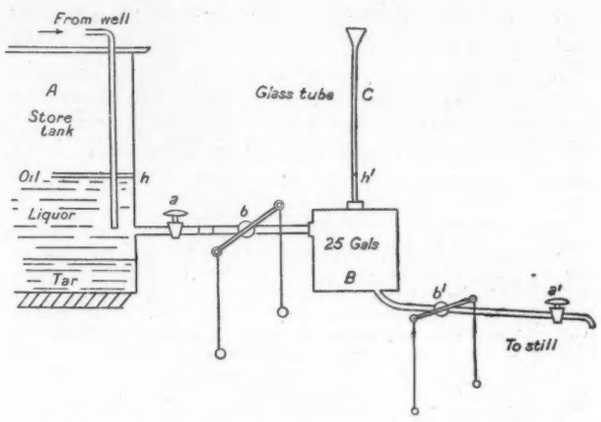


Fig. 1.—Acid "Bubbler."



A. Store Tank. *a a'* Cocks—*a* Open; *a'* Partly Open.
B. Tank, 25-gallon capacity. *b b'* Lever taps—*b* Charges the tank B; *b'* Empties it.
C. Glass gauge tube and anti-splash funnel.

Fig. 2.—Liquor Feed.

in the tube C shows the corresponding height *h* in the store tank at any given moment, and thus acts as a gauge. A layer of oil is placed on the surface of the liquor in the tank A to obviate any loss of ammonia, and oil is also used on the surface of the liquor in the well from which A is filled.

The still is stopped while liquor is being drawn from the bubbler for evaporation, or, if possible, only started in the morning after the bath has been made up by adding fresh acid.

This arrangement of plant has been in use since November, 1916, and has given entire satisfaction. By its means the amount of ammonia leaving the bubbler has been reduced to 3 grains per 100 c.ft. Formerly, tests from 13 grains upwards were usual, and the bubbler effluent is now uniformly acid.

Rotary Washer.

The function of the washer is two-fold in the direct process—it serves to condense moisture and to control the amount of ammonia passing to the purifiers. In this respect, it may be said to resemble the last ammonia scrubber in the older process. Worked under ideal conditions, the washer would be kept as cool as possible and receive a regular flow of ammoniacal liquor of controlled strength—weak in summer, strong in winter. Unfortunately, the working conditions are far from ideal—the requirements of the purifiers vary according to the condition of the oxide, and the tension of ammoniacal liquor cannot be controlled at will when the only liquor available is virgin liquor of low strength; and in the winter, when purifiers need most ammonia, the rotary is least willing to part with it. It is desirable, therefore, to have a bye-pass in reserve. This should be arranged to deliver crude gas beyond the rotary; otherwise much of the ammonia supplied is removed by the washer and returned to the well. At "Works G," the only available bye-pass is a 2-in. pipe from the inlet to the exit of the rotary; and there is no secondary source of supply to the second purifier, as at "Works E."

The results are presented in Table C. It will be seen that the average amount of moisture condensed per twenty-four hours (by calculation) is 3·8 gallons per 100,000 c.ft. of coal gas, or nearly 2½ cwt. per week; the average reduction of temperature being 5·7° C. (10° Fahr.). The effect of the rotary in removing excess of ammonia from the gas above that required in the purifiers is illustrated by Experiment No. 2 (Table C), where an inlet test of 142 grains per 100 c.ft. of gas was reduced to 34 grains at the outlet. In Experiment No. 5, on the other hand, an inlet test of 6 grains was raised to 11 grains at the exit. Experiment No. 7 shows the neutralizing effect of the rotary on the 2-in. bye-pass—68 grains reduced to 16 grains.

It is evident that to work a rotary successfully, one should have at command a table showing the ammonia content of gas grains per 100 c.ft.) for liquor of varying temperature and strength. The preparation of such a table would be well worth the attention of a gas-works chemist, and would afford a useful guide in scrubber practice. Coal gas might be passed through liquor of known strength at various temperatures, and the volatilized ammonia be caught and determined.

Working of Purifiers.

This has been characterized by extreme irregularity. A supply of fresh bog ore, ordered for the summer, was only delivered in the late autumn, and had to be put into immediate use with 56 p.ct. of moisture, and at a time when the make of gas was approaching its maximum. The precaution was taken of mixing the bog ore with half its weight of dry partially spent artificial oxide and raising the temperature of the boxes by means of steam, and ammonia was freely supplied by means of the bye-pass. But

TABLE C.—*Effect of Rotary Washer on Ammonia Content of Coal Gas.*

Experiment.	Acid Bubbler.		Holmes Rotary Washer. 4 ft. Diam., 8 Sections, 325 Gallons of Liquor.				Crude Coal Gas Entering and Leaving Washer.					Remarks.
	Sulphuric Acid. (H_2SO_4) per 100 Parts.		Virgin Liquor Feed.		Free Ammonia. Parts per 100.		Volume. Cubic Feet per 24 Hours.	Temperature °C.		Ammonia. Grains per 100 C. Ft.		
					First Section.	Last Section.						
No.	Bottom Layer.	Top Layer.	Gallons per 24 Hours.	Free Ammonia. Parts per 100.	Where Gas Enters.	Where Gas Leaves.		Inlet.	Exit.	Inlet.	Exit.	
1	..	..	55	1·05	0·91	0·97	79,000	25·0	22·0	13	39	1½-in. bye-pass closed.
2	14·8	Alkaline (equiv. to 0·1 p.ct. H_2SO_4).	60	1.04	1·18	0·98	65,000	25·0	20·0	142	34	" " "
3	..	1·3	50	1·03	0·65	..	90,000	24·0	19·0	29	27	" " "
4	..	0·8	50	1·03	0·86	..	82,000	23·0	16·5	14	26	" " "
5	..	Acid	*Nil*	0·95	0·22	0·32	87,000	25·0	20·5	6	11	" " "
6	..	2·2	*Nil*	..	0·48	0·90	131,000	16·0	8·0	3	6	1½-in. bye-pass closed. Neutralizing box in use on bubbler.
7	..	8·5	60	..	2·23	1·35	130,000	14·5	6·5	68	16	1½-in. bye-pass open. Neutralizing box in use.
						Average temperature . . .		21·8	16·1	Calculated average amount of moisture condensed per 100,000 c.ft. of gas per twenty-four hours = 3·8 gallons.		

serious disorganization followed; and until the oxide is matured and drier and the make of gas reduced, conditions will remain critical.

Undoubted benefit has resulted from the protection afforded to the sides of the purifiers from cutting wind. The management were unable to face the expense of enclosing the purifiers in a suitable shed; but relief was afforded by using the planks that covered the purifier pits to case the sides of the boxes. The planks were placed so as to form a sloping "roof" against the boxes. When a box fouls, the necessary gangway is formed for emptying and recharging by temporarily replacing the planks in position. This device has proved successful, and by means of a limited supply of steam to the pipes placed beneath the bottom grids a temperature of over 30° C. (86° Fahr.) is readily maintainable in the first two boxes. Before the change, and without the use of steam, the temperature fell to 13° C. (56° Fahr.) in the leading box, and the box had to be changed. Further, it is significant that since the purifiers were cased-in the temperature of the oxide on the top grid of the fourth box now exceeds that of the inlet gas by 8° to 9° C. (13° Fahr.)—previously by barely 1° C.

Temperature records have been carefully kept by the manager since November, 1916. In this case, thermometer tubes were inserted through the sides of the purifiers, as there is no fixed section in the lids—the ends of the tubes enter the oxide, and are plugged to prevent the escape of gas and consequential disturbance to the oxide. The curves are extremely irregular in character and difficult to analyze in the absence of complete data respecting the character of the reacting gases and the condition of the oxide. But the manager has found the records of use, and is continuing them for his own guidance. Considerations of space render it impossible to include in the report a set of curves similar to those given above for "Works E;" but it may be of interest to gas managers if the curves relating to Experiment No. IV. (Table D) are given, when the amount of gas passed was raised to 4·4 million cubic feet by careful attention to the ammonia by-pass and steam-pipes and free use of air—indeed, it was probably the failure of the steam supply at the end of the period that caused the purifiers to fail. The temperature curves are clearly affected by the steam, but show little relationship to the make of gas. The tops of the boxes were in this case protected by sheets of galvanized iron; and the top layer of the first purifier in this case is noticeably active. The fouled oxide when removed contained only 1·5 p.ct. of moisture.

In Table D, an attempt has been made to co-ordinate the data relating to periods of good and bad working. A sufficient supply of ammonia was present in all cases—good and bad—to ensure absence of "soluble salts of iron;" and the working temperature of the boxes was suitably maintained. Disorganization here, as at "Works E," was probably due to the use of fresh bog ore highly charged with moisture at a time when the make of gas was at a maximum. Compared with the results obtained at "Works E" (Table B), the rise of temperature on the middle layer of the first purifier is low; and it is probable that the very artificial means of heating the purifiers employed at these works may cause greater disturbance to the system than at "Works E."

Loss of Ammonia.

The recovery figure for 1915 was given as 17 lbs. of sulphate of ammonia per ton of coal carbonized; for 1916, it is 18½ lbs. The latter figure is much below expectations, and raises some doubt whether the amount of ammonia leaving the retorts is really as high as one has generally supposed. But stocks are difficult to measure accurately in small works, and at best the recovery figure is only approximate. Means are now being taken to measure the virgin liquor, with a view to determine the amount of ammonia therein and in the gas entering the bubbler, and thus arrive at an approximate figure for the recoverable sulphate. Preliminary test shows the following results for winter working:

Data.—Make of gas . . 10,500 c.ft. (60° Fahr.) per ton of coal.
Virgin liquor . . . . 13 gallons.
Virgin liquor retained by tar . . . . . ·6 ,,
— Total, 13·6 ,, ,,

Ammonia in crude coal gas entering the "bubbler:"

	Grains per 100 c.ft.
On Feb. 6, 1917	146
,, 7, ,,	122
Mean	134

Gas bye-passed to purifiers, half-hour per day.
Spent liquor from still (say) 20 gallons per ton of coal.
Ammonia in same, about 0·05 p.ct.

Whence,

	Ammonia in terms of Sulphate of Ammonia, lbs. per ton of coal.
Entering "bubbler" $\frac{10,500}{100} \times \frac{134}{7000} \times \frac{132}{34}$ =	7·8
In virgin liquor and tar $\frac{136}{100} \times 2 \times \frac{132}{34}$ =	10·6
Entering purifiers (say) 2 p.ct. of 7·8 =	·2
Total =	18·6

Table D.—Condition of Purifiers during Various Periods of Working—Good and Bad.

Experiment.	Moderate. I.	Poor. II.	Bad. III.	Very Good. IV.
Period	Dec. 18/16 to Jan. 3/17	Jan. 10/17 to Jan. 18/17	Jan. 31/17 to Feb. 3/17	Feb. 3/17 to Mar. 7/17
Number of days	16	8	3	32
Gas passed.				
Thousands of cubic feet	2370	1270	478	4420
Rate per 24 hours, c.ft.				
Whole period	148,000	159,000	159,000	140,000
Last day	143,000	166,000	147,000	134,000
Average gas passed per square foot superficies per 24 hours.	1020	1100	1100	970
Steam below bottom grids	All boxes	All boxes	All boxes	All boxes (supply fails last day).
Ammonia bye-passed.				
1½-in. bye-pass inlet to exit bubbler (rotary stopped).	Full on	Full on	Full on	Full on
All gas bye-passed (with rotary working).	Average, 25 min. per day.	Average, 30 min. per day.	Average, 40 min. per day.	Average, 2¼ hours per day. (On five nights all gas bye-passed during repairs to plant.)
Oxide of iron as charged.				
First purifier	¾ new bog; ¼ old.	¾ new bog; ¼ old.	¾ new bog; ¼ old.	Old artificial oxide.
Second purifier	,,	,,	Old artificial oxide.	Old bog oxide (30 p.ct. S.).
Fouled oxide.				
Character	Alkaline, 2 grids.	Alkaline, 2 grids.	Alkaline, 1 grid.	Alkaline, 2 grids.
Soluble iron	*Nil*	*Nil*	*Nil*	*Nil*
Average moisture (all grids) per cent.	8·8	18·5	Very moist	1·5
Temperature.				
First purifier. Average, all grids.				
Whole period . . .°C.	36·0	30·5	29·5	32·5
At finish . . . .°C.	40·5	30·5	30 0	29·0
Second purifier.				
Whole period . . .°C.	31·0	29 5	28·0	37·5
At finish . . . .°C.	34·0	30·5	29·5	28·5
Excess temperature of middle over bottom layer—Average .°C.				
First purifier	+4·5	− 5	*Nil*	−1·5
Second purifier	+4·0	+ 5	+3	−5·5

Experiments on the Sulphiding of Hydrated Oxide in Model Purifier.

The experiments were only commenced in January, 1917, and were of a preliminary character, to determine the best method of procedure. The material treated was a sample of unused N.E. Dutch bog ore. The purifier consisted of a glass cylinder about 305 mm. (12 in.) long by 45 mm. (1¾ in.) diameter, fitted at each end with a rubber stopper carrying the necessary connections. A glass rod, centrally placed, carried four superimposed rubber discs to serve as grids. The discs were pierced with holes, and covered with a thin layer of cotton wool to support the oxide. About 58 c.c. of oxide were used in each experiment, allowing a depth of rather more than 12 mm. (½ in.) on each grid. The gas used was crude coal gas leaving a scrubber fed with gas liquor containing about 1·95 p.ct. free ammonia; and in one experiment, with a scrubber temperature of 8·5° C. (47° Fahr.), the ammonia content of the gas was found to be 6·3 grains per 100 c.ft. of gas. Air is injected into the coal gas for use in the purifier at a later point in the system. No estimation of oxygen was made during the tests; but the amount present would, doubtless, be small. The direction of flow was downwards through the cylinder. Contrary to expectation, it was found that the greater part of the sulphiding proper occurred in the top layer of oxide; the remaining three layers being mainly effective in absorbing the residual traces of sulphuretted hydrogen. Observed through the glass, the oxide on the top grid was seen to blacken progressively downwards; the oxide on the second grid began to blacken towards the end of an experiment; that on the two lower grids showed no change of colour. But it is significant that, with the selected rate of flow—which was about 1½ times that of coal gas through an oxide purifier per unit of area at maximum rate (1000 c.ft. per square foot superficies per twenty-four hours)—traces of sulphuretted hydrogen were invariably found in the exit gas leaving the bottom grid. It was impossible, therefore, to determine the process of sulphiding by means of a lead-paper test, as in ordinary practice, and recourse had to be made to standard iodine. A satisfactory indicator was provided by passing the exit gas through a Drechsel's bottle containing 4·5 c.c. of N/10 I and 100 c.c. of water. The experiment was stopped as soon as ever the iodine was exactly

decolorized, and the volume of gas needed to effect the change was taken as a measure of the efficiency of the oxide under the observed conditions.

Much time had to be spent in determining the best procedure to follow; but it was finally decided to operate always with the same *volume* of material, whatever its density and degree of humidity. Samples of the oxide, therefore, were dried at various temperatures, and their efficiency compared with that of an equal volume of the undried material (58 c.c.) at different temperatures and varying rates of flow. Time did not permit of extending the experiments to determine the effect of varying the proportion of ammonia and air; but it is hoped to continue the work as opportunity offers. The following results are of interest. They indicate:

First.—That oxide of 16 p.ct. moisture—corresponding approximately to $Fe_2O_3 3H_2O$ (16·8 p.ct. moisture) is markedly more efficient than equal volumes of oxide containing 37 p.ct. moisture ($Fe_2O_3 6H_2O$) and oxide dried at 100° C. (Fe_2O_3) respectively, at both high and low temperatures.

Secondly.—That the efficiency of oxide shows a marked increase with every rise of temperature under all conditions of hydration.

Efficiency of Bog Ore—Effect of Hydration and Temperature.

Oxide Charged.	Time.	Total Gas Passed.	Rate of Flow.	Relative Efficiency.
58 c.c.	Mins.	c.c.	c c.per Min.	
1. — Temperature. — 36° C. (97° F.):				
Air dried, 47 grams . . . (16 p.ct. moisture.)	125	67,000	535	100
Undried, 40 grams . . . (37 p.ct. moisture.)	116	59,800	515	89
Dried at 100 C., 47 grams . (Moisture, *nil.*)	69	38,400	555	57
2. — Temperature. — 5° C. (41° F.):				
Air dried, 46 grams . . .	52	26,200	505	39
Dried at 100° C., 47 grams .	37	19,700	535	29
Undried, 40 grams . . .	33	15,700	480	23

ADULTERATED COAL—FROM A NATIONAL ASPECT.

By Norton H. Humphrys, Assoc.M.Inst.C.E., F.C.S.

That the coal at present being supplied to gas undertakings contains appreciably more inorganic matter than was usual in pre-war days, and that the make of clinker per ton of coal carbonized is consequently increased at the expense of products that are useful both in a National and in a commercial sense, is a notorious fact. The gas industry consumes about 18 million tons of coal per annum; and if the increase of incombustible matter is assumed to be 5 p.ct. of the whole—which, according to personal experience, is by no means an excessive estimate—it follows that purchases of this magnitude include 900,000 tons of worse than useless material, all of which is invoiced and paid for at the current exorbitant price of coal. A gas-works formerly using 10,000 tons of coal per annum, now finds that 10,500 tons are required to get the same effect. The money loss is directly £750; and we shall see presently that this by no means covers the whole.

Much might be said about common honesty and financial relations as between buyer and seller, and the desirability of an arrangement similar to that obtaining with sulphate of ammonia, under the provisions of the Food and Fertilizer Acts, whereby the payments made by the purchaser are based on the quantity of useful material, rather than on the actual gross weight supplied. On the present occasion, however, the subject is viewed from a national point only, not as affecting the accounts of gas undertakings or the rights of gas consumers, but in its relation to the conservation of labour, of transport, and economy of fuel, all of which are of paramount importance at the present moment in connection with the gloomy forebodings that are being advanced by competent observers, as to the prospects of supply during the ensuing winter. As such, it deserves serious consideration by all interested in these matters. It certainly equals in importance many of the suggested expedients for economy of fuel.

The cost of labour and transport is proportioned to the bare avoirdupois weight of material dealt with, quite irrespective of quality—a fact that does not appear to be fully appreciated. There is an evident tendency to regard a ton of best "North Country" as the same thing as a ton of "Welsh" or "Somerset." The expenses incidental to conveying and handling a ton of the most inferior coal are not less than for dealing with the highest quality of coal obtainable, even though it may be worse than useless, regarded as a source of economy in these respects.

Confining attention for the moment to the manufacture of coal gas, the increased cost of labour is not finished when the charge is placed in the retort. For the most part, it is repeated on the residual coke. In the retort-house, where it is usually drawn direct from the retort into the furnace, there is the handling of the excessive weight of ash, the whole of which passes on with the coke; the enhanced difficulty of adjusting the combustion and the air supply within the most advantageous limits; the heavy labour incidental to the removal of clinker; the increased quantity of useful combustible that is entangled in, and retained by, the same; and the serious increase in the cost of repairs and renewals, due to the shortened life of the furnace lining and the adjacent parts of the setting. All this applies also to the suplus coke sold to all classes of users. Evidently the wastage due to the additional 5 p.ct. of ash is far from being limited to a bare *pro ratâ* increase on the cost of transport and labour, or on the lower proportion of useful products obtained.

The loss of heat absorbed in raising the useless inert matter to the retort or furnace temperature, as represented in terms of tons of coal, is not an insignificant matter. The 18 million tons, including the 900,000 tons of added ash, must be raised to a carbonizing temperature of about 2000° Fahr. Taking the specific heat of the ash as equal to that of fire-clay, 0·22, the heat expended on the 5 p.ct. of ash alone is:

$$900{,}000 \times 2240 \times 0{\cdot}22 \times (2000 - 60) = \text{(roundly) } 86{,}000 \text{ millions B.Th.U.}$$

And so far as regards five-sixths of the coke, at least, this loss is repeated when it is consumed, in addition to the *pro ratâ* advance on loading and handling charges. The total loss from this source alone is therefore in the neighbourhood of 158,000 million B.Th.U. As it involves the consumption of additional coke in the retort-house, which otherwise might be sold and go to replace a corresponding heat value in terms of coal, and the practical available heating value of coal is some 22½ million B.Th.U. per ton, it will not be far wrong to represent it as equivalent to a loss or waste of more than 7000 tons of coal per annum.

Gas-works take only a small proportion of the total output of coal; but the above considerations apply equally to coke-ovens, and, with the exception of the repetition on the residual coke, to coal used for raising steam, the domestic fire-grate, and general fuel purposes. We may take it, therefore, that the causes that have tended to depreciate the quality of gas coal also apply to other varieties. So far as house coal is concerned, the depreciation is certainly not less. Instead of discussing useless and impracticable schemes, such as prohibition of the use of raw coal, or interference with the free right of purchase (conditions that would create so much friction between all parties concerned that, if they were adopted, the absolute necessity for a return to something very much like "as you were" would soon be evident), attention might well be directed to these practical considerations as a more likely direction in which to look for the desired results—viz., economy of coal, with a corresponding reduction in labour and transport difficulties, which have already reached an acute stage. The labour position is aggravated by the fact that the larger proportion of it is beyond the capabilities of females or substitutes, and calls for the services of physically fit men.

North British Association of Gas Managers.

The programme of the 56th annual meeting of the Association, which is fixed for Friday, the 7th prox., in the Philosophical Society's Hall, Bath Street, Glasgow, states that the chair will be taken at 10.30 by the President, Mr. John Lang, of Alexandria. In addition to the Presidential Address, there will be two papers—one by Mr. H. G. Ritchie, of Irvine, on "Continuous Vertical Retorts in a Fifty-Million Works;" the other by Mr. G. H. Sharples, of Glasgow, on "Tar Dehydration." The Council have decided that there shall be no lecture under the William Young Memorial Trust this year; and there will be no excursion. Owing to the large increase in the cost of printing, stationery, and other charges, the Council will recommend an increase in the annual subscription rates. The President will move that the name of the Association be changed to the "Association of Scottish Gas Engineers and Managers;" and the necessity of forming a National Gas Council for Scotland will also be discussed. During the proceedings there will be an adjournment for lunch.

Gas-Driven Motor Buses.—It is stated by the "Motor" that Messrs. Chapman & Sons, of Eastbourne, by running their coal-gas service from Eastbourne to London and back, have been instrumental in forming a chain of gas-charging stations on the route, with improved filling facilities. At each station gas-pipes have been brought out to the main road—thus obviating the necessity for running vehicles into yards and backing-out. The charging stations are at the following places: Whyteleafe, 14 miles from London; East Grinstead, 15 miles on; Uckfield, 13 miles on; and Hailsham, 12 miles from Eastbourne.

The Institution of Heating and Ventilating Engineers.—The Council have issued an appeal for further monetary support for the research work that is being carried on at University College, where the Department of Heating and Ventilating Engineering was some years ago established with a grant of £300 a year from the London County Council. The financial support at first accorded having unfortunately to a large extent fallen off, application for a grant was made to the Government Department for Scientific Research. As a result, the Advisory Council offered to recommend a grant of £225 per annum for the next two years, on condition that the Institution contributed a further sum of at least £150, and that the total amount of £600 should be expended during the two years on certain stipulated work. This offer the Council of the Institution have accepted.

STATE CONTROL OF GERMAN GAS-WORKS.

An Official Ordnance.

THE Imperial Commissioner of Electricity and Gas—Prof. W. Kübler—has issued an ordinance which came into force on July 26, of which the object is to ensure the working of gas-works. The text of the ordinance and the attached regulations have been reprinted in the "Journal für Gasbeleuchtung" of the 4th inst.; and from this source we have made the following summary of them.

In order to ensure uninterrupted working of gas-works the Commissioner orders:

1.—Each gas-works must appoint one or more (according to its size) trustworthy representatives; preference being given to the manager of the works. In the case of State or Municipal undertakings, the representatives are to be chosen by the authority, and their selection does not affect their responsibility to the State or Municipality.

2.—New house connections, new service-pipes, and the installation of gas bath-water heaters and gas-fires are prohibited. In extremely imperative cases, with meters not exceeding 100 lights, the representative of the gas-works may make an exception provided it does not strain the output of the works; but such permits are subject to retraction. Other cases must be referred to the Commissioner through the proper department of the Central War Office.

3.—Gas consumption is to be restricted:

(*a*) Local rules are to be issued by the representative with due regard to the prevailing conditions. These are to be framed after consultation with the local authorities; and where the works supply a number of districts, undue preference to any district must be avoided. The extent of limitation of the supply will be settled for the time being by the Commissioner; being on a uniform technical basis for all works.

(*b*) Public lighting is to be restricted to the utmost possible extent.

(*c*) The representatives are empowered to prohibit the use of gas-fires for warming rooms.

(*d*) The lighting of lighting burners and cooking appliances for the purpose of warming rooms is prohibited.

(*e*) Contraventions of sections 2 and 3 (*a*), (*c*), and (*d*) are punishable by cutting off of the gas supply and by penalty.

4.—In industrial or factory installations in which gas is used, the manager, foreman, and assistants are each responsible in their particular sphere for the observance of the local rules made by the representatives and approved by the Commissioner.

5.—Industrial and business consumers are prohibited from accepting further orders the undertaking of which would cause or necessitate an extension of their allotted gas consumption.

6.—To what extent this Order is to be applied to consumers who manufacture the gas they use will be decided later.

7.—The gas-works are to charge an enhanced price, which the Commissioner will state in the attached regulations, for every cubic metre of gas consumed in excess of the allowance under section 3 (*a*).

The consumer, for a second or further contravention of sections 2 to 5, and the fitter for section 2, will be punishable by imprisonment for a term not exceeding one year and/or by a fine not exceeding £500.

REGULATIONS.

I.—(*a*) Consumers, until further notice, must not use more than 80 p.ct. of their preceding year's consumption during the same period between meter readings.

(*b*) If the prescribed calorific power of the gas has been altered since the preceding year, the 80 p.ct. allowance of gas is to be increased or diminished proportionately.

II.—The limitation applies even to works engaged on work of importance to the war. Exceptional allowances, subject to revocation, are in general granted only for pressing war work, communal kitchens, hospitals, infirmaries, railway works, and water works, and extend in the first instance only to Oct. 1 next. The representative settles such allowances in consultation with the proper department of the War Office; but appeal may be made to the Commissioner.

III.—Works which last year limited gas consumption may, through their representatives, modify the 80 p.ct. restriction now ordered to compensate for the previous limitation.

IV.—New consumers are to be treated on the same basis as existing consumers of the same class.

V.—Exceeding the allowance for any period is to be prevented by stringent measures. For each cubic metre of gas consumed in excess of his allowance, a consumer is to pay the gas-works an additional sum of 50 pf. (=14s. 2d. per 1000 c.ft.). In special cases, this surcharge may be increased with the approval of the Commissioner.

VI.—The representative must issue the Order and regulations, and see that they are enforced within a week from the date of their promulgation (July 26, 1917).

LIMITATION OF GAS SUPPLY IN GERMANY.

Further Press References.

THE correspondent to whom we have been indebted for previous translations of what has appeared in the "Vossische Zeitung" on the subject of the projected limitation of gas supply in Germany, has now forwarded two further articles from the same source, which were published on the 12th and 13th inst.

EXTRACT from the "VOSSISCHE ZEITUNG" of AUG. 12.

LIMITATION OF GAS.—CONDITIONS FOR GREATER BERLIN.

As already reported, a decree has been issued by the Government Commissioner for Electricity and Gas, limiting the use of gas by 10 p.ct.

The officials who have to carry out its terms have now fixed the conditions for Berlin, which they have published in the "Gazette." The maximum annual consumption is as follows:

365 c.m.	through a coin meter	. . . .	24 c.m.	for Sept.	= 847 c.ft.
550 c.m.	,,	an ordinary 5-lt. meter	.	32 c.m.	,,	1,130 ,,
800 c.m.	,,	,, 10 ,,	.	52 c.m.	,,	1,836 ,,
	(or a coin meter of the same capacity)					
1600 c.m.	,,	a 20-lt. meter or coin ditto		103 c.m.	,,	3,637 ,,
2400 c.m.	,,	30 ,, ,,		155 c.m.	,,	5,473 ,,
3200 c.m.	,,	40 ,, ,,		207 c.m.	,,	7,310 ,,
4800 c.m.	,,	60 ,, ,,		310 c.m.	,,	10,946 ,,

For industrial or public-utility purposes, special conditions will prevail; but even then the consumption must not exceed 90 p.ct. of the quantity used last year. The limitation also affects war-work establishments. For some few establishments—as infirmaries, communal kitchens, and traffic—exceptions may be made. Any quantity consumed beyond the limits as fixed above will have to be paid for at the rate of 50 pfg. per c.m., [14s. 2d. per 1000 c.ft.]

It is further ordained that public lighting is to be limited as much as possible. In streets where traffic is not heavy, only the so-called indicator lamps need be alight.

The calorific value of the gas will, according to requirement, be reduced by admixture of water gas so far as this can be done—regard being paid to the purpose for which the gas is used. The gas-works will at once enter into negotiations with the large consumers respecting the reduction of their consumption.

EXTRACT from the "VOSSISCHE ZEITUNG," of AUG. 13.

LIMITATION OF THE GAS SUPPLY.

The long-expected decree respecting the limitation of the use of gas has everywhere evoked expressions of the bitterest disappointment. Although the officials responsible for it are all practical men, their decree pays not the slightest regard to actual conditions.

As we have repeatedly pointed out in this paper, Greater Berlin has a large number of households which have taken to gas in order to use it for cooking and heating purposes.

It was originally stated that the use of gas in households would be limited by 10 p.ct., at the most 20 p.ct. That would have been accepted by the greater part of the population. Now absolutely no difference is made between gas used for lighting and gas for cooking purposes.

Before us lie the records of a household which, from necessity, uses for cooking purposes the whole of the gas through a 5-light meter. No other form of combustible is at its disposal. By the most economical management, 800 c.m. were required during last year. According to the new decree, it can only have 550 c.m.—a decrease of 30 p.ct. A whole host of families will, owing to the partial cessation of the central hot-water supply, be compelled to use more gas for cooking.

Have the officials, who have not even considered it necessary to submit for consideration to the communal representatives their stipulation which so closely affects the economical life of Greater Berlin, never considered that coal for cooking purposes is just now as good as if there were none to be had? The little coal which has been allotted to the smaller households must be saved for the winter, for protection against the cold. Petroleum as a means of lighting scarcely exists. Installations of electric light must not be made. A limitation of lighting gas in favour of cooking gas, the use of which (also in consequence of the changed conditions of subsistence) in many households, especially the smaller, has become unquestionably higher, appears impossible. How can they continually be on the watch that the consumption does not exceed the prescribed limits?

A whole lot of unsolved problems have been conjured-up by the new decree, which, in spite of its notification long ago, has suddenly come on us by surprise. The managers of the gas-works in Greater Berlin must be aware of this, for their telephones were never still all the morning. Will they be able to offer a solution at the interview they will have to-morrow with the representatives of the Berlin Press?

To us it appears as if the whole question must not hinge upon an entirely schematic limitation according to the number of meter lights. If anywhere, individual requirements must be given more consideration. The chief thing, however, is to arrange for a better supply of coal. As we learn from an authentic source, matters would be much better in this direction if another distribution of coal were arranged for—more in accordance with the need of Greater Berlin.

Institute of Metals and Gas-Heating.—At the autumn meeting of the Institute of Metals, on Sept. 19, nine papers are to be read, two of which will be of special interest to gas people. Mr. A. C. Ionides will treat of the "Principles and Methods of a New System of Gas-Firing;" while Mr. H. James Yates, of Birmingham, will contribute some "Additional Notes" to a paper to be read by Mr. L. C. Harvey, on the subject of "Fuel Economy in Brass-Melting Furnaces."

SIXTY YEARS AGO.

From the "Journal" of August, 1857.

Accident at the Chartered Gas-Works.—About half-past ten on Friday night last an occurrence took place at the Chartered Gas-Works, situate in Brick Lane, St. Luke's, which for some little time caused considerable consternation in the locality. We have been favoured with the following facts, which may be relied upon as strictly authentic. It appears that in the course of the fearful thunderstorm which passed over the Metropolis early in the evening, the cap on one of the cast-iron columns which supports the ends of the two girders was struck by the lightning. The cap was split, and the action of the gasholder in descending, by the escape of gas for the public supply, caused one of the guide-columns to be thrown over, bringing with it two of the girders connecting the columns, portions of which, falling with great violence upon the crown of the gasholder, occasioned three extensive fractures of the plates, from which the gas immediately rushed forth in large volumes. The immense iron column fell into the yard with a fearful crash, and broke up into four portions, one of which, falling upon the roof of the adjacent retort-house, broke through the cast-iron principals and lantern, but happily without occasioning any injury whatever to the numerous workmen engaged at the time in the building. At the time of the occurrence, the gasholder contained about 100,000 c.ft. of gas (the total capacity of the holder being 340,000 c.ft.). The ignition of the gas took place from a lamp in the yard, and occurred free from any explosion whatever, simultaneously with the falling of the girders and column, which gave the first intimation of any accident having occurred. For the space of about five minutes, the whole of the Metropolis was brilliantly illuminated by the immense body of flame that rose up high in the air. Several fire-engines arrived shortly after the outbreak of the flames. Fortunately, however, the services of the firemen were not required; for, owing to the admirable directions given by Mr. Upward, the Superintendent of the works, and the exertions of the men under him, the flames were subdued in a comparatively short period. The means adopted for extinguishing this immense body of flame were as follows: It was at once found that any application of water was perfectly useless; and the fractures being of very large dimensions, Mr. Upward, who had mounted on the top of the gasholder, personally placed several wetted boards over the apertures, so as to form a foundation for the application of wetted sacks, luting, and clay, which had the effect of extinguishing the flames in the space of about ten minutes.

The Laming Purifying Process.—At a most opportune moment, when gas managers are required to purify their gas with a minimum of expense, of nuisance, and of deterioration, Mr. Laming announced in glowing terms, by an advertisement which recently appeared in our columns, the grand *desideratum*—an absolutely unobjectionable process, offering "economy in room, labour, and materials, impossibility of nuisance, and a total absence of injury to the illuminating power." Curiosity was universally excited by this announcement, which it has been impossible to gratify till the all-important document termed the "specification" was registered; and we will now endeavour, as far as the obscurity, complexity, and verbosity of this specification will admit, to extract from it the "two grains of wheat hid in two bushels of chaff."

Canadian Gas Association.

It was at one time intended that a joint meeting of the National Commercial Gas Association of America and the Canadian Gas Association should be held in Detroit this year. The war, however, interfered with the intention being carried out; but the Executive Committee and the majority of the members felt it would not be well to allow the year to go by without the usual gathering. So this year the Executive arranged for a two-day meeting to be held in Toronto during "Fair time"—to-morrow and Thursday. The programme is only a short one—the President's (Mr. J. P. King, of Stratford, Ontario) address, various Committee reports, and formal business, and two short papers, the titles of which were not given, and discussions. Luncheon, dinner, and trips (on both nights) will fill out the time fixed for the gathering.

Gas-Meters in the United States.

The National Commercial Gas Association of America were recently asked to name the total number of meters in use in the United States for artificial gas; and as no such list was available, a compilation was made by searches through various channels. The figures are published in the August "Bulletin" of the Association. It is seen that there were in use at the end of 1916: Ordinary meters, 5,323,137; prepayment meters, 1,485,973; type not designated, 838,653—total 7,647,763. The State having the largest number in use was New York, with 1,897,663; and the smallest, Wyoming with its 661. After New York came (in the order named): Illinois, 902,084; Massachusetts, 659,542; Pennsylvania, 621,312; New Jersey, 583,200; California, 514,128. Then there is a big drop to Michigan, 323,583. After that there is no State using anything approaching a quarter-of-a-million meters.

GERMAN ASSOCIATION OF GAS AND WATER ENGINEERS.

Report of the Council for the Year 1916-17.

The following is an abstract translation of the first portion of the Annual Report of the Council of the German Association of Gas and Water Engineers, as presented to the General Meeting of the Association, which was held in Berlin on June 22 last.

War Activities of the Association.

For the third time the annual report has to deal with a year of war. Owing to the course of military events, and "after the scornful refusal by our enemies of the offer of peace," the people have had to make still heavier sacrifices of blood and property; and all work hitherto devoted to peaceful ends has had to be concentrated on the war. Consequently, the gas and water industries in the past year have had to contend with far greater difficulties than previously. It has therefore more than ever been the duty of the Council to extend and supplement the work of its organization in the service of the country, the army, and the navy, and in adopting war measures for the maintenance without interruption of the work of its members. Ungrudging and vigorous support to these efforts has been given by the Association's Committee on the Working of Gas-Works, and especially by its Berlin members, as well as by the Central Gas Bureau and the Commercial Union of German Gas-Works. Obviously, details of the work done cannot be given at the present time; but a brief review of the year's war in relation to the activities of the Association may be presented.

It appeared from the outset that gas-works were intimately concerned, both subjectively and objectively, with the events of the war. Prof. H. Bunte, the Acting General Secretary of the Association, received a summons to Berlin to participate in deliberations on important technical war questions and measures directly bearing on the working of gas-works. Primarily, these were the supply of tar and ammonia for the benefit of the army, navy, and agriculture, having regard to the cutting-off of imports of nitrate of soda and oil. These matters were dealt with by the officers, for the time being, of the Association, assisted by their Berlin colleagues—viz., Herren Reese (Dortmund), Lempelius (Berlin), Terhaerst (Nuremberg), Körting (Berlin), Schimming (Berlin), and Pfudel (Charlottenburg), since deceased. The execution of the adopted measures was entrusted to the Commercial Union of German Gas-Works, which deals with the bye-products of a large number of works. Circulars were issued giving orders for the reservation and disposal of these products, and the production of concentrated ammoniacal liquor. The organization which still exists was thus brought into being. Recently, at the request of the Imperial Commissioner of Nitrogen Supplies, it has undertaken to compile statistics as to the output of ammonia and ammonia salts by German gas-works.

After the State had sequestrated important metals, which were indispensable in meter manufacture, a pronounced shortage of gas-meters was felt, when the scarcity of petroleum caused a considerable increase in the number of gas consumers. To overcome the difficulty thus created, an impartial office was formed by the Central Gas Bureau, with the support of the Union of German Gas-Meter Makers, to deal with applications for the necessary metal, and the testing of other materials and substitutes and their distribution. The office had also dealt with the supply of other materials, such as iron, leather belts, &c., necessary to gas-works. The Council issued a strong recommendation to gas undertakings to adopt the system of charging one price for gas whatever the purpose for which it was used; thus liberating the surplus meters, required under the system of differential prices for gas sold for various purposes which was hitherto prevalent in Germany.

A question of special importance, both materially and financially, was the extraction from the gas of benzol, &c., for munition purposes. In settling and rapidly carrying into effect measures therefor, the Association had the co-operation of its Instructional and Experimental Gas-Works, as well as the advice of two of its members well experienced in coke-oven practice—viz., Dr. Reuter and Dr. C. Schmidt.

Coal Supply.

During the first winter of the war—viz., 1914-15—the coal supply to gas-works was, with few exceptions, almost faultless; but during the spring of 1916 interruptions occurred in deliveries, and the stocks of coal on gas-works rapidly decreased. On April 18, 1916, a conference upon the matter took place at the Prussian Ministry of Commerce and Industry, which was attended by representatives of the colliery owners. The upshot was, broadly, that the supply to gas-works of a sufficient quantity of usable coal was regarded as assured. Gas-works were notified of the arrangements made, by which they were to apply to their usual suppliers for the coal they required, and in case of difficulty to appeal to Herr Lempelius as the representative of the Association's Committee on the Working of Gas-Works. But this announcement has not been fulfilled. From the beginning of the severe winter of 1916-17, transport difficulties grew, and with them complaints of deficient deliveries began. In the course of time these complaints became general, and a few works were unable to meet the demands for gas. In some places it became necessary

to restrict the output of gas considerably by limiting the supply to certain times, or even by interrupting it entirely.

Meantime, numerous proposals were made for economizing coal or replacing it partially or entirely by other gas-making raw materials, such as lignite, wood, &c., or for adding water gas to the coal gas. The Association's Committee on the Working of Gas-Works, in the course of several sittings, thoroughly discussed and examined these proposals and other possibilities. Owing to the great differences in local conditions, the Committee refrained from making general recommendations; but its members expressed themselves as ready to publish, or communicate through the District Associations, their practical experiences of the proposals, &c., so as to give the other members some guidance on the measures applicable to particular cases. The information thus afforded has assisted in overcoming many difficulties.

The Association have done everything in their power to ward off a repetition of the shortage of coal, with its consequent unavoidable interruptions of gas supply, by which large sections of the public suffer greatly both in the home and in business, and serious dangers are courted. In April last, the Central Gas Bureau inquired by circular of all gas-works what their coal requirements would be for the year 1917-18. The replies furnish almost complete figures for the coal consumption of German gas-works, totalling about 10 million tons. They have been laid before the Official Coal Distribution Department, and ought to form a basis for further measures. It is hoped that the strong representations made in this way will ensure the requirements of gas and water works being duly provided for. The importance of these works to the public at large has been set forth, as a ground for preference being accorded them in the allotment and transport of coal, in petitions to the Federal Council and to the Head of the War Office. [The petitions are reproduced in an appendix to the report of the Council.] Coal Distribution Bureaux have been started for the general supply of places with sufficient fuel, especially for the coming winter; and the co-operation with them of gas managers is specially desired, and will doubtless be given.

The Council have given attention to the rising price of coal, which continues to fall off in quality, and have addressed a petition on the matter to the Chief Imperial and State authorities. So far, however, these petitions have had no result.

Taxation.

The Coal-Tax Bill was adopted by the Reichstag with very little alteration, and was promulgated on April 8 last. It puts a tax, the proceeds of which go to the Imperial Exchequer, on both imported and home-raised coal, equal to 20 p.ct. of the value at the pit's mouth. Provision is made for gas, water, and electricity works to make legally an addition to their existing tariffs, equal to the increase in manufacturing or working expenses caused by the tax. The Federal Council can appoint Arbitration Courts to decide questions in dispute as to the incidence of the tax.

The Association appointed a Special Committee on Taxation to study and report upon this coal-tax in all its aspects. The Committee held several sittings to discuss the bearing of the tax on gas and water works, the mode of passing it on to consumers, and the Arbitration Courts to settle disputes. [The text of the Association's petition on the matter to the Federal Council is appended to the report.]

Curtailed Use of Gas.

The Federal Council have ordered a reduction of gas consumption, with a view to avoiding any waste of gas; but as the Order referred only to consumption for lighting purposes, and left the much more important use for cooking untouched, the Council offer no criticism of the Order. Also, the Federal Council last spring introduced "Summer Time" on a more extended scale than last year. The information collected as to the effect of the measure last summer showed that, while a reduction of consumption could generally be traced therefrom, it was in no way of serious proportions, and there is no reason to anticipate any considerable change on the same account this summer.

A Gas Department has been established by the War Supplies Office to grant permits for necessary repairs and extensions on gas-works. The head of the Department is Prof. Kübler, who has the assistance of a Committee of eight members, of whom six—viz., Herren Hase (Lubeck), E. Körting (Berlin). Lempelius (Berlin), Prenger (Cologne), Terhaerst (Nuremberg), and Schimming (Berlin)—are members of the Association. The Department began work in April last.

Labour.

Steps were taken by the Association to procure the exemption or return of indispensable men and officials, and representations made to the authorities of the great importance of gas and water supply both to the civil population and the war departments were received favourably, with the result that gas and water works have been classed with munition factories, &c., as regards reservation of employees. [A reprint of the petition on the subject which the Council addressed to the Minister of War is attached to the report.] The representations of the Council that retort-house labour should be entitled to the scale of rations for those engaged in the heaviest toil were also acceded to.

Much has been done in the course of the year towards providing men discharged from the Services with training to enable them to pursue civil careers. With this object, several courses of instruction for gas-fitters, and one at Carlsruhe for gas testing, have been instituted; and already reports of the services rendered by those who have been thus trained have been received, which are very favourable.

Co-Operation of Technical Associations.

Thanks to the harmonious co-operation of the Central Gas Propaganda Bureau and the Commercial Union of German Gas-Works with the Association, gas-works have suffered comparatively little throughout the thirty-five months of war; and it may be hoped that they will be in a position still to serve the community equally well. In order to avail themselves as far as was reasonably possible of the valuable assistance of Herr Lempelius, the Director of the Central Gas Bureau, the Council decided to entrust him, along with Herr E. Körting, of Berlin, and Herr Kümmel, of Charlottenburg, with the representation of the Association's interests in Berlin. Also, in order to signify the co-operation of the two bodies, it has been arranged that the Central Bureau shall become affiliated to the Association in the same way as the District Associations.

(To be continued.)

RAPID ESTIMATION OF THE STRENGTH OF SULPHURIC ACID.

The "Analyst" publishes the result of an investigation upon this subject by Mr. H. Droop Richmond, F.I.C., and Mr. J. E. Merreyweather. In reproducing the article, the "Chemical Trade Journal" says: While it appears a simple problem, the rapid estimation of the strength of sulphuric acid presents many practical difficulties. The direct titration involves a weighing of a very hygroscopic substance, and a titration with a strong standard alkali, which has an appreciable coefficient of expansion. Under these circumstances rapidity is not easy of attainment, and Messrs. Richmond and Merreyweather have found that the factors which make for rapidity do so at the expense of accuracy.

The density cannot be employed as an index of the strength, owing to the abnormal density of strong sulphuric acid; the maximum being attained at 97·5 p.ct. The gradients of acids near this strength are low, and the influence of impurities on the density and the temperature corrections sufficiently large to render the calculation of strength from the density unreliable.

The authors turned to another physical property—the heat evolved on dilution—and found that this gives good results in a minimum of time. Howard has described a method for determining the strength of sulphuric acid from the heat evolved on mixing an oleum of known SO_3 content with water; and the authors have adopted one detail from his paper—the use of a vacuum-jacketed flask as a calorimeter. Their method consists in measuring 400 grms. of water at about 18° C. into a vacuum-jacketed flask, provided with a stirrer and thermometer reading to 0·01° C. The temperature soon becomes constant and is read off. Then 5 c.c. of the sample are measured in, allowing the pipette to drain for fifteen seconds, and the mixture stirred till the temperature is constant. No cooling corrections have been found to be necessary.

The water equivalent of the calorimeter was found to be 14·5 grms., and the volume of sulphuric acid delivered by a 5 c.c. pipette 4·911 c.c., varying from 4·869 c.c. to 4·926 c.c. From the mean of these data, and from the results of Pickering, the following formula was calculated:

$$\% = 100 - 7{\cdot}6\,(3{\cdot}994 - R).$$

With other calorimeters the formula is:

$$\% = 100 - 7{\cdot}335 \times \frac{400 + w}{400}\left(4{\cdot}139 \times \frac{400}{400 + w} - R\right).$$

There is some slight doubt as to the proper value for the corrections to infinite dilution to be subtracted from Pickering's figures for a strength corresponding to the author's final dilution, as the two series given by him do not agree very well. But they have taken the mean.

Using this formula, they have found the following results:

R.	Percentage Calculated.	Percentage by Titration.
3·635°	97·3	97·4
3·49°	96·2	96·1
3·22°	94·1	94·2
3·15°	93·6	93·6
3·01°	92·5	92·4

The concordance of duplicate determinations has been excellent, and usually within 0·02°.

The formula connecting percentage and rise of temperature is not quite so simple as that given. But the errors introduced by the simplification are less than those of experiment.

The method is very rapid; avoids all weighings; does not expose the acid to air; and entails nothing more than rinsing to clean the apparatus.

Next Saturday, the members of the Manchester and District Junior Gas Association will visit the works of the Staveley Coal and Iron Company. As the works are under Government control, no visitors are to accompany the party, which will inspect the extensive foundry, coke-oven plant, and bye-products works at Staveley, and lunch there on the invitation of the Directors of the Company.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Increased Tar Provision—Advice Wanted from the National Gas Council.

Sir,—The whole gas profession has been startled by a letter and circular sent out by the National Gas Council regarding the production of additional tar.

Now that gas engineers have had time to consider the instructions given by the Ministry of Munitions, they are at a loss to know if the National Gas Council (who we all understand is an Advisory and Consultative Council) were actually consulted about this important matter, and, if so, whether they fully considered and approved of the instructions that were issued by the Ministry. Whether or not they did this, as the circular was distributed by them, we are all looking for counsel, definite advice, and guidance from the Council on this matter.

The opportune article in this week's "Journal" indicates that the instructions may be a step in the wrong direction, and that, if the advice given in the circular is acted upon, it may be doomed to failure and disappointment. Your remarks, Sir, will certainly have some influence on the gas industry. It appears to me that we may all be involved in much trouble and expense, and the very results desired may be negatived by our action. We are therefore anxiously awaiting some advice and lead from the Executive of the National Gas Council, as upon them the industry relies for guidance in the many and important matters connected with war requirements. If the quantity of tar is increased per ton of coal carbonized, certainly for explosive purposes a poorer quality of toluol and benzol will result; the make of gas will be very much reduced per ton of coal; and if more plant (as suggested) is used, I do not know where the labour is to be found for working it.

Certainly, I, for one, want more reliable information on this question, as at present the scheme laid down does not appeal to my judgment and practical experience. Therefore, as a gas man anxious to do my part, I should like some sound, convincing evidence that the suggested line of operation is the correct one for achieving the dual desire of the Ministry of Munitions.

A Gas Engineer who Desires Advice from the Gas Council.

Aug. 22, 1917.

Increasing Tar by Lower Temperature Carbonization.

Sir,—I have carefully read the valuable leader in the last issue of the "Journal" upon the above most important question. As I read your remarks, you doubt and question on practical and technical grounds the request conveyed in the circular of the Ministry of Munitions, which may be taken to have been endorsed by the National Gas Council from the fact that they acted as the circulating medium. I have no doubt that we are all very desirous of producing the extra tar that is so urgently required for the furtherance of the war.

I believe I possess some exceptional evidence in support of your doubts. It shows that, if the instructions in the circular are acted upon, instead of an increase of the total output of tar, there will be a very material decrease. Gas engineers generally have been trained to make gas so as to secure profits at high temperatures; and, although they all know that by reducing the volume of gas made per ton by lowering the carbonizing temperatures a little more tar will be produced, they also know that such tar will not be so good from the point of view of the yield of suitable toluol and benzol. [The circular, however, only refers to quantity, but says nothing as to quality, which is a very important factor.]

I am not aware of any gas engineer who has ever made, or would ever dream of making, an experiment with a view to ascertain what total output of tar per day he could produce at low temperatures by sacrificing a large volume of gas per ton of coal carbonized and at an increased cost for labour. Therefore, I conclude that the gas industry has been called upon to take a step in the dark—not knowing what morass it will lead them into, and the enormous sum of money that may be incurred. And I fear, too, that they have no former experience to guide them in estimating the cost.

In support of my former statement as to decreasing the volume of tar, instead of increasing it, I am compelled, on public grounds, to point out to the gas industry that, during the last seven months, I have been occupied in directing the working-out of what I believe to be the largest practical experiments that have ever been made in this country on the carbonization of coal for chemical and other purposes, but the results of which it was not intended should at present be made public. The circular to gas undertakings on the required larger production of tar for war purposes, however, has altered the intention; and, as some of the practical results that we have secured bear very definitely upon this very important question of tars produced at high, medium, and low temperatures, I thought that the special experience we have gained would at this juncture be of value to the gas industry generally.

I was approached last year by a large chemical company having works in England and abroad, who desire in future to put up all their plants in England, for the good of themselves and the Old Country. They wished me to take charge for them of some large and elaborate experiments in the carbonization of coal for various chemical purposes; and this work has been going on, and is still proceeding with the assistance of four chemical experts (two emanating from London, and one an eminent Doctor of Science), and other gas engineers and operators. We have been working continuously at a modern gas-works with a setting of retorts carbonizing from 15 to 17 tons of coal per day; so that we have already experimented with about 3000 tons of coal. All this work had one object—the realizing of the best scientific knowledge attainable for the lay-out and design of a very large chemical works suitable for producing explosives, motor spirits, dye products, fertilizers, &c., to be erected at the pit mouth. These experiments have been most helpful. One result is that I advised the Company to purchase certain collieries. This they have done; and we shall start erecting the works as soon as the war is over.

I now propose to give you a few of the results of these experiments bearing chiefly upon the tar question. The Chairman of the Company, at my request, has kindly given me permission to do so for the benefit of the gas industry.

The commercial aspect of the carbonization of coal with high, moderate, and low temperatures has naturally received the specially careful attention of the experimenters; and it has been proved beyond a doubt that high-temperature carbonization produces by far the highest results per day for the labour and capital employed.

The following are a few results of the carbonization of coals, particularly bearing on the various outputs of tar produced at high, moderate, and low temperatures:

Test made with Coal of Poor Quality, containing a Large Percentage of Ash, and Carbonized at both High and Low Temperatures.

	No. 1.—Four Days' Test of Coal at High Temperature.	No. 2.—Four Days' Test of Coal at Low Temperature.
Temperature outside retorts (average)	1400° C. (2562° Fahr.)	978° C. (1793° Fahr.)
Coal carbonized	43·1 tons	12·97 tons
Total gas made	495,280 c.ft.	94,346 c.ft.
Gas made per ton (corrected to 60° Fahr. and 30 in. bar.)	11,491 c.ft.	7272 c.ft.
Total yield of tar (dehydrated)	259 gallons	140 gallons
Tar made per ton of coal carbonized (dehydrated)	6 gallons	10·8 gallons
Calorific power of gas	441 B.Th.U.	479 B.Th.U.

	Gallons.
Total output of tar in four days at high temperature	259
" " " " low temperature	140
Reduction in output due to low-temperature carbonization	119 (or 46 p.ct.)

Test Made with Coal of Good Quality "H" Carbonized at High and Low Temperatures.

	No. 3.—Two Days' Test of Coal at High Temperature.	No. 4.—Two Days' Test of Coal at Medium Temperature.
Temperature outside retorts (average)	1404° C. (2559° Fahr.)	1160° C. (2120° Fahr.
Coal carbonized	34·32 tons	17·73 tons
Total gas made	477,053 c.ft.	237,351 c.ft.
Gas made per ton (corrected to 60 Fahr. and 30 in. bar.)	13,899 c.ft.	13,387 c.ft.
Total yield of tar (dehydrated)	447 gallons	292 gallons
Tar made per ton of coal carbonized (dehydrated)	13 gallons	16·5 gallons
Calorific power of gas	578 B.Th.U.	523 B.Th.U.

	Gallons.
Total output of tar in two days at high temperature	447
" " " " low temperature	292
Reduction in output due to low-temperature carbonization	155 (or 34·7 p.ct.)

The following excellent results were obtained in a

Two Days' Test of a Good Quality of Coal Carbonized at High Temperatures in the Ordinary Way. Afterwards Steam was introduced into the Retorts for the Purpose of Making Blue Water Gas.

	Two Days' Test of Coals at High Temperature Carbonized in the Ordinary Way.	Two Days' Test of Coal about the same High Temperature, with Steam Added to Make Blue Water Gas.
Temperature outside retorts (average)	1400° C. (2552° Fahr.)	1387° C. (2529° Fahr.
Coal carbonized	3308 tons	3193 tons.
Total gas made	464,184 c.ft.	530,126 c.ft.
Gas made per ton (corrected to 60° Fahr. and 30 in. bar.	14,032 c.ft.	16,603 c.ft.
Total yield of tar (dehydrated)	556 gallons	640 gallons.
Tar made per ton of coal carbonized (dehydrated)	16·8 gallons	20 gallons.
Calorific power of gas	533 B.Th.U.	505 B.Th.U.

It will be observed from the first experiment that we obtained a large increase of tar per ton of coal carbonized at low temperature, but of very poor quality, compared by analysis, with the high-temperature tars, and at a very great sacrifice of volume of gas, time taken up, and excessive cost per ton of coals for labour; while the total output per day of tar was very materially decreased, as the figures clearly prove.

The second experiment was made with a good coal at both high and medium temperatures; the latter being about the temperature employed in most gas-works at the present time. But we got about the same diminution of output in coals and tars, as in the first experiment—and the analysis showed that the lower temperature tar did not produce so good results in toluol and benzol as the high-temperature tars. The results further indicate that about double the plant will be required, which means double the cost on capital expenditure and labour charges to produce the same volume of tar as at high temperatures; and it is my opinion that there is not sufficient plant in the

country to produce the tar asked for by the Ministry of Munitions for war purposes by low-temperature carbonization methods.

Knowing the anxiety of gas engineers who have consulted me as to increasing their make of gas per ton, I have made other experiments with a moderate sample of coal. I first tested it in the ordinary way, with the results shown; and I afterwards added steam in sufficient quantities to produce blue water gas in the same vertical retorts, also with the results shown side by side. It will be observed that I produced a very largely increased volume of gas, and at the same time the volume of tar was materially increased—the gas being just over 500 B.Th.U.; but you will notice that this was accomplished by quite the opposite methods to those laid down in the circular.

The general results show that the larger volume of tar produced per ton of coal carbonized is inferior to that produced by high-temperature carbonization as regards toluol and benzol. Apparently in issuing the instructions and circular, sight has been lost of the important fact that, by lowering the temperature of carbonization, the total daily output of tar is at once materially reduced, which will considerably outweigh an increase in the make of tar per ton of coal by low-temperature carbonization. Besides this, the make of gas per ton of coal carbonized will be reduced to an alarming extent; and at the present time gas engineers are most desirous of increasing their make of gas per ton to help them over their financial and other difficulties. An exceptionally large increase of plant would be necessary to comply with the instructions; and I am of the opinion that this plant is not in existence or available at the present time. In most gas-works, too, the carbonizing plant is now undergoing repairs for the coming winter. Another objectionable feature of the proposal is that extra labour will be required at an enormous cost—indeed, I am of the opinion that such labour cannot be obtained to meet the proposal.

From the results of the experiments enclosed, it is obvious that the best course to pursue is for the Ministry of Munitions to continue to advise the public to use gas in every possible direction. By this means, more coal could be carbonized, and consequently a greater output of tar and ammonia products would be recovered. Sulphate of ammonia is now urgently required for agricultural purposes, and other ammonia products for high explosive purposes. As far as my present experience goes, I am strongly of opinion that the only way to meet the desired increase of tar is to advise all gas companies and corporation undertakings to carbonize as much coal as possible at a high temperature, and, if possible, to put to work further carbonizing plant for the purpose. If this plant should make more gas than is required by the consumers, the surplus gas, after being stripped of toluol and benzol, should be used for heating the retorts. By this means, more coke would be available; and this material is much desired at the present time.

By the means suggested, the most suitable tar for war purposes would be obtained, and in greater quantities, than by any other method; and at the same time an all-round advantage would be secured, without unnecessarily spending public money.

Southport, Aug. 22, 1917. JOHN WEST.

SIR,—Your leader in the "JOURNAL" for the 21st inst. contains some reflections on increasing the production of tar in gas-works which I believe to be founded on a misconception.

The quantity of tar obtainable from gas-works can be augmented in one of four ways:

(i.) By the substitution of coal gas for water gas.
(ii.) By reducing the temperature of carbonization.
(iii.) By reducing both the temperature and the pressure of carbonization.
(iv.) By reducing the time of the retort charges.

The first method is already being adopted in some works—especially where stocks of gas oil have given-out, and difficulties have been experienced in obtaining fresh deliveries.

The second method can only be carried out where a water-gas plant or where spare carbonizing plant is available. For it must be assumed that whatever method be employed, the supply of gas shall adequately meet the demand. This being so, spare benches, together with a number of the fully-worked retorts, could be devoted to low-temperature carbonization without restricting the total output. Alternatively, all the settings could be worked at the lowest temperature which yields the total desired quantity of gas. The adoption of such a method would result in each manager working at a temperature depending on the proportion of spare to total plant possessed. Where a water-gas plant is available, it would be possible to reduce the temperature of the retorts, making up the gas deficiency with water gas; but it is doubtful whether the total make of tar would in this way be increased.

The third method depends on the fact that to convert coal into the maximum amount of tar, it must be distilled at the lowest possible temperature, to avoid decomposition of the liquid products. As existing gas-works plant is not suitable for the production of "vacuum" tar, this method need not be further considered.

The fourth process is one which can be most readily adopted, as it involves only a slight change in the prevailing routine. It is based on the assumption that, in modern practice, no tar is being evolved during the last hour or so that a charge lies in a retort; so that, from the standpoint of tar production, this time is wasted.

By withdrawing the charge an hour or two earlier, and working at the usual heats, the quantity of tar made per retort is increased in direct proportion to the additional amount of coal carbonized.

There is no reason to expect that this method would yield a better quality tar, except in so far that it is in contact with a richer gas. The drop in the gas make per ton would probably be fairly balanced by the increased quantity of coal carbonized.

The effect of these methods on the benzene and toluene in the gas should be considered. By shortening the period of charging, the gas would contain a larger percentage of aromatic hydrocarbons. By reducing the temperature of carbonization, the gas would also contain more hydrocarbon vapour, but of a composition differing materially from that normally obtained. The ratio of benzene to toluene—usually about 3 or 4 to 1—would tend to become inverted, while the amount of paraffins would be increased.

These remarks apply to low-temperature tar—the methyl derivatives, toluene, the cresols, methyl, naphthalene, &c., increasing at the expense of the simple ring compounds, benzene, phenol, naphthalene, &c.

Aug. 24, 1917. B.Sc.

SIR,—With reference to your leader on "Lower Temperature Carbonization and Tar Production," and your remarks at the bottom of the first column of last week's issue, it appears to me there is an error in your premises, and that your argument, in consequence, largely falls to the ground.

You state: "Reduced carbonizing temperatures mean a reduction of carbonizing capacity per unit of plant," and that "it follows that diminished capacity means diminished throughput of coal." I think a more careful consideration of the matter will lead to the opinion that reduced carbonizing temperatures mean a reduction of gas-producing capacity per unit of plant; but surely there is no ground for stating that the throughput of coal will be reduced. On the contrary, it is within the experience of most gas engineers that, in order to maintain high temperatures with retort-settings of only moderate efficiency, the throughput of coal has to be restricted. It therefore follows that in such cases, if lower temperatures were adopted, the throughput of coal could actually be increased, although not to any large extent.

The practicability of the low-temperature carbonization proposal seems to me to depend almost entirely upon the provision of the necessary supplies of additional coal and additional labour. These are essentials for such a scheme; and unless they can be guaranteed, gas engineers cannot possibly carry out the requests made to them, and at the same time keep up the supplies of gas to their districts.

Although as a general principle, gas in place of coal is to be commended, under the present abnormal conditions and the certainty in many works of every available retort being in use this winter, it is to be hoped that any active propaganda with the object of increasing the use of gas will be left over until after the war. Most engineers and works superintendents find the prospects facing them for the coming winter to be almost alarming; and certainly increased demands for gas are the last things to be desired. When conditions are more normal, we shall all hope for a big development in the demand for gas in place of coal, and will be able, I hope, to extend our plants to deal with it.

Weston-super-Mare, Aug. 24, 1917. JAS. TAYLOR.

[With reference to our correspondents' comments, we may refer them to the data given in the letter (above) of Mr. John West and to an editorial on the subject this week.—ED. "G. J."]

The Question of Sliding-Scale Injustice.

SIR,—Although it is undeniable that the present untoward circumstances could not possibly have been contemplated by any sliding-scale arrangements, it does not necessarily follow that sliding-scale companies are entitled to relief from the consequences of them.

Has it been sufficiently considered that some, at any rate, of these companies are still in a position to pay dividends at their standard rates, and that most, though not perhaps all of them, have for many years paid dividends in excess of these standard rates, and consequently in excess of what would have had to content them had they remained maximum dividend companies? What answer is to be made when the question is asked—as it will assuredly be asked in Parliament—why such companies cannot take the rough with the smooth? What, in such case, would become of co-partnership with the consumer?

Assuredly, however, a continuance of conditions such as did not exist when present obligations were incurred would fully justify an application for revision of terms. But have we yet the materials on which to base such an application, and would it be listened to at the present time if it were made? I am afraid the answer to both questions is in the negative.

CHAS. HUNT.

17, *Victoria Street, S.W., Aug.* 25, 1917.

SIR,—The pages of the "JOURNAL" and its Editor's time are so generously applied in this cause that I hesitate to again worry you upon the present iniquitous position. But one or two points arising out of the South Metropolitan meeting on the 15th inst. cannot be ignored.

The Chairman (Mr. Charles Carpenter, D.Sc.) complains that sliding-scale companies are unable to compete with free industrial concerns. But, Mr. Editor, does he expect trades unionism, as an act of grace, to arrest *its* claims because *ours* are neglected, or that while war continues the cost of living will do anything other than generally advance? Has sufficient of the shadow not yet been seen to prepare us for coming events?

The ups-and-downs of gas output now come under the influence of fortune's wheel rather than management; but not *all* have experienced the good fortune which materially reduces standing charges to the immediate benefit of dividends.

And what do shareholders know of the suspension or postponement of renewals or repairs as a consequence of the present war, and prospective ill-effect upon dividends unless there be relief?

Mr. Paddon's quaint conceit that "Not one (of the great gas companies in the country involved by the sliding-scale) would be heard in Parliament until the claims of the South Metropolitan Company and its larger neighbour had been considered" is, without rudeness on my part, absurd.

Coal contracts of gas undertakings in the North have been completely disorganized for the convenience and benefit of those in the South; and if the *South* does not move, the *North* will.

If half the energy would only be displayed in some quarters over shareholders' true interests as was recently manifested over an untimely Building Scheme, we should realize "Some Move."

Aug. 24, 1917. OIKONOMIA.

Re-Issue of Debentures.

SIR,—With regard to the inquiry in this week's "JOURNAL," you may be interested to learn what was done by my Company in similar circumstances.

In 1915, certain debentures became due for repayment; and new ones for the same amount were issued and sent up for stamping and registration. We were then informed that the officials in the stamp office required to be satisfied that the sanction of the Treasury Commissioners to the issue of the instruments had been obtained before they would proceed to impress the duty. A long correspondence followed. The Company were required to give an undertaking not to incur fresh capital expenditure in existing circumstances for any purpose, unless of pressing necessity in connection with war requiremnts. The sanction of the Treasury Commissioners to the issue was at last obtained.

Further debentures falling due in 1916, I wrote for advice to the Chartered Institute of Secretaries (of which I am a member) asking whether they could be kept in force. Their reply was as follows:

> "Yes, by agreement with the debenture holders; but such agreement must be made *before* the date when the debentures become due. [How such an arrangement would be regarded by the Treasury authorities is doubtful; we believe they would require some of the debentures to be paid off.] The agreement can be effected by endorsement on the debentures."

The debentures were accordingly renewed by endorsement [copy enclosed], signed by the holder and by myself on behalf of the Company, and stamped with a 6d. stamp ["JOURNAL," March 7, 1916, p. 537, and March 14, p. 591]. The same thing was done again this year.

I did not consult the Treasury Commissioners on the matter, and have heard nothing from them about it.

A. S. CAMPBELL, Secretary, Wellingborough Gas Company.

Wellingborough, Aug. 22, 1917.

[ENCLOSURE.]

MEMORANDUM.—It is agreed that the repayment of the principal sum of one hundred pounds secured by the within bond is postponed, and that it shall be paid off at any time after the expiration of six months' written notice by either party, such notice expiring on any day appointed for the payment of interest. And it is further agreed that the interest shall be increased from 4 p.ct. per annum to 5 p.ct. per annum from the 1st day of July, 1917.

Dated this day of 1917.

REGISTER OF PATENTS.

Manufacture of Ammonium Sulphate.—No. 108,098.

ADAM, W. G., of the Beckton Tar and Ammonia Products Works.

No. 17,940; Dec. 13, 1916.

The patentee says: For many years trouble has been experienced with ammonium sulphate, as made commercially, owing to its acid character. Commercial ammonium sulphate contains from 0·5 to 2 p.ct. of sulphuric acid, and the acid destroys the bags in which the sulphate is packed. But, according to his invention, commercial ammonium sulphate is rendered neutral by passing ammonia gas through it—the sulphate being placed on a grid and the ammonia gas blown through it, or the sulphate may be continuously fed into an inclined rotating cylinder in which it meets a stream of ammonia gas passing in the opposite direction.

The patentee mentions that he is aware that it has been proposed to employ the bisulphates or the acid sulphates of ammonia for treating gases so as to obtain ammonia therefrom; and he is also aware that it is not novel to treat dry broken-up acid ammonium sulphate with ammoniacal gases to convert the acid sulphate into neutral sulphate. What he claims is: "Passing ammonia gas through commercial ammonium sulphate to render it neutral substantially as described."

Destructive Distillation of Carbonaceous Substances. No. 108,200.

WELLINGTON, S. N., of London Wall, E.C.

No. 10,658; July 27, 1916.

This invention relates to the destructive distillation of coal at comparatively low temperatures; and it has for its object "to effect the further decomposition of the constituents of the gases and vapours evolved in the distillation and to avoid the presence of paraffin bodies in the resulting gas and tar."

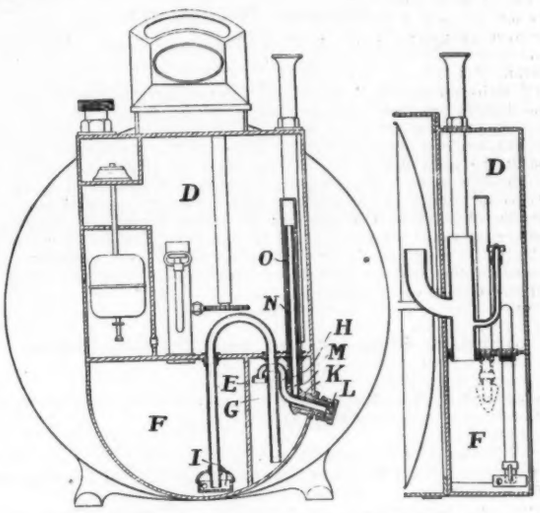
The distillation is effected within vertical retorts gradually tapering outwardly towards the lower end—the retorts being advantageously formed of an oblong sectional shape [no drawings accompany this specification]. The distillation is carried on at a comparatively low temperature, and preferably the heat is applied to the retort in two or three zones. For example, the retort may be divided into four zones. In the lower one the heat applied to the charge may be about 450° C.; in the zone next above, it may be 500° C.; while in the zone next above, it may be 550° C. In the uppermost zone, a free space is left; and the heat there applied may be from about 980 to 1200° C. Within this space a grid is suspended from the top cover plate of the retort (by a rod cased in fire-brick) and made of any form which will present a considerable area for contact. The grid is formed of metal, fire-clay, carbon, or metal oxide. By this means the rich hydrocarbon vapours containing paraffin bodies are subjected to heat by which they are partially or wholly converted into aromatic bodies; and the gases produced undergo decomposition.

Wet Gas-Meters.—No. 108,206.

WILSON, J., and PARKINSON AND W. & B. COWAN, LTD., of Fitzalan Street, Kennington Road, S.E.

No. 10,792; July 31, 1916.

This invention relates to meters having "an upright return conduit for maintaining a double seal against the escape of gas from a compartment in which the junction of the two limbs of the conduit may be carried above the level to which liquid may rise in the compartment"—the object being to "render such sealing devices for wet meters less susceptible to entirely losing their supply of sealing liquid."



Wilson's and Parkinson and Cowan's Wet Gas-Meter.

The meter shown is of the usual construction, having a front box divided by a horizontal shelf so as to form a large upper watering compartment D, while the lower portion is divided by a vertical partition E into a waste-water box F and an adjoining and smaller compartment G. Through apertures in C pass the two limbs of an inverted **U**-tube into the compartments F and G. The former leg reaches nearly to the bottom of F, and the other one as far as possible down the compartment G. The apertures, by means of glands or stoppers, are rendered gas-tight—the semicircular portion being carried up as far as is necessary within the compartment D to give any required seal to the compartment F.

Within the waste-water box is a small receptacle like I, the bottom of which is only sufficiently removed from the bottom of the syphon tube to allow free access of liquid to it. In the side or bottom of it is a small hole (the cross-sectional area of which is less than that of the tube) through which liquid can enter the receptacle and reseal the tube after it has been emptied, due to the level in the box falling to the edge of the receptacle. The compartment G has a water outlet syphon H of ordinary type, in which an annular passage K surrounds the portion of the tube passing through the casing. The ends of the passage and the water outlet tube are both closed by a cap upon the outside of the meter casing.

As heretofore constructed, the annular passage is provided with an air pipe leading up into the top of the water outlet syphon compartment; but according to the present invention the ordinary short air pipe is replaced by a pipe M (of considerably increased length), which reaches up above the top of the compartment G into D. In order to accommodate the pipe, an orifice is formed in the shelf C immediately above the pipe. It is made large enough to contain an outer tube N which encloses M and provides an annular passage O surrounding it. The pipe N is closed at its upper end, and its open lower end preferably extends a short distance below the bottom of the syphon H or the water level of G. The tube N forms a return conduit sealing device for the compartment G, to prevent gas escaping from it in the event of a pressure above that of the atmosphere existing while water is issuing from the syphon.

In operation, the distance between the liquid levels in the box F and the syphon compartment G will be the same as in a meter of ordinary construction; but the length of the **U**-tube provides an increased seal owing to the fact that when the liquid in the waste water box has been driven to the bottom of the right leg the **U**-tube will not immediately become completely filled with the gas, because as soon as this enters it will only occupy the higher portion of the tube and force down the liquid in the left leg. In these circumstances, the liquid will form a seal sufficient to balance the difference in pressure between the gas in the box F and that in the upper portion and right leg of the **U**-tube; while the pressure of the latter is balanced by the height of the liquid between the level in the compartment G and the level to which the liquid is forced down in the leg of the tube situated in it. This will allow a considerable difference between the pressures existing in the waste-water box F and the syphon compartment G without any actual passage of gas from one chamber to the other.

The seal formed by the extension of the air-pipe M and the provision of the covering tube N prevents liquid passing too rapidly from the waste-water box F through the **U**-seal tube, as might occur when a meter which has been watered at a moderate pressure has the syphon outlet cap removed when under a much higher pressure. Instead of the pressure in the compartment G being immediately re-

duced to that of the atmosphere when the syphon outlet cap is removed (as is the case in ordinary constructions), the return conduit sealing device formed by the extended air-pipe M and the covering-tube N prevent this, as the water is driven up the annular space O between the two and forms a seal sufficient to balance the increase of pressure in the syphon compartment, while the syphon H itself prevents the escape of anything but liquid at a speed corresponding to its resistance, until the liquid level has fallen below the syphon mouth. A pressure surge will not, therefore, result in loss of gas, and the kinetic effect of a rush of liquid will not readily unseal the U-tube.

Mixing the Gaseous Constituents of a Combustible Mixture.—No. 108,277.

IONIDES, JUN., A. C., of Porchester Terrace, W.

No. 3611; Nov. 8, 1916.

This invention relates to devices for mixing the constituents of a combustible gaseous mixture—being a modification of patent No. 102,983. The object is to obviate the difficulty of back-firing in the conduit leading from the mixing device to the combustion chamber, consisting in a device for mixing the combustible constituents by a whirling motion in an annular chamber or conduit in which the device is formed of fire-brick or like refractory material positioned closely adjacent to the chamber in which combustion occurs. It further consists in a round-nosed or like pointed end of a refractory cylinder forming the inner surface of the annular chamber being moved to co-operate with a coned or tapered seating to control the outlet orifice of the chamber.

Treating Coke for Use with Heating Stoves. No. 100,968.

SCHOLLKOHLEN-GESELLSCHAFT M.B.H., and SCHOLLENBRUCH, A., of Dusseldorf, Germany.

No. 10,425; July 24, 1916. Convention date, July 22, 1915.

The object of this invention is so to improve coke in an inexpensive way, that "its effect is very similar to that of good pit coal."

The coke, in medium or small size pieces, is introduced into a fluid material containing a mixture of thirty parts of coal dust and twenty parts of clay mixed with water, and vigorously stirred up with the coke until it is taken up and all the pores of the coke filled with the coal and clay mixture.

The coke remains in the bath from twelve to twenty-four hours, according to the size of the pieces; and, after it has been taken out, it is treated with material which likewise consists of coal dust, clay, and water, but is less fluid. Equal parts of coal dust and clay may be used and be stirred up into a pulpy state with the thickly liquid residue from the bath previously used, until the material forms a complete coating for the coke. Then the pieces, after being dried, are sprinkled with "unalloyed coal dust in order to improve the appearance."

The treatment described is said to approximately restore to the coke the properties of pit coal. The coke burns slowly and produces a clean sootless fire, which can be treated like a pit-coal fire; while it is "freed from the disagreeable crackling sound which has always been observable hitherto when it is burning."

The new fuel is produced very cheaply, the patentees remark, as, in consequence of the increasing production of gas and bye-products, the production of coke is constantly greater, and coke can be obtained relatively cheap, while the materials employed in the mixture—viz., coal dust and clay—are almost valueless.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for Aug. 22.]

Nos. 11,588—11,895.

ALEXANDER, R. M.—"Applying coal gas for driving internal-combustion engines." No. 11,609.

ANDREWS, F. A.—"Cutting metals by gases." No. 11,666.

BANKS, W.—"Bunsen burners." No. 11,879. And "Water-heaters." No. 11,880.

BRAY & CO., G.—"Gas-burners." No. 11,724.

COUCHMAN, A.—"Machines for pleating and sewing incandescent mantles, &c." No. 11,776.

FLETCHER, RUSSELL, & CO.—See Banks.—Nos. 11,879, 11,880.

FLETCHER, T. W.—See Banks. Nos. 11,879, 11,880.

FRYER, G.—See Andrews. No. 11,666.

GIBBONS BROS.—"Continuous annealing-furnaces." No. 11,718.

HALL, H. E. and HAMBLET, J.—"Production of hydrocarbon gas for power uses." No. 11,870.

IONIDES, A. C.—"Gas lighting." No. 11,891.

JAMES, T. C., and JONES, O. T.—"Synthesis of ammonia." No. 11,619.

MARLE, M. VAN.—See Gibbons. No. 11,718.

MAXTED, E. B.—"Pressure furnaces for use in synthesis of ammonia, &c." No. 11,643.

PERRY, T.—"Gas cooking-stove lighting torch." No. 11,831.

SMITH, T. A.—See Maxted. No. 11,643.

THEISEN, H. E.—"Purifying, cooling, and mixing gases." No. 11,766.

The centenary of the public lighting of Glasgow with gas occurs on Sept. 15 next year; and the Watching and Lighting Committee of the Glasgow Town Council recommend that it be remitted to a Special Sub-Committee to consider and report as to what should be done to commemorate the event.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

South Staffordshire Mond Gas (No. 2) Bill.

Before the adjournment, there was read and referred to the Examiners a petition of the South Staffordshire Mond Gas (Power and Heating) Company under their common seal, praying for leave to bring in a Bill to confer further borrowing powers upon the Company, together with a copy of the proposed Bill annexed thereto. The Bill is to be read a second time on Oct. 17.

LEGAL INTELLIGENCE.

FINE FOR ILLEGAL USE OF COPPER.

Before Lord Ilkeston (the Stipendiary), at the Birmingham Police Court, last Tuesday, the Parkinson Stove Company, Ltd., were summoned for unlawfully failing to comply with an order restricting the use of copper, made by the Minister of Munitions, and for using 9 cwt. of copper sheet in the manufacture of geysers and water-heaters, contrary to Regulation No. 2 E. of the Defence of the Realm Act. They were also summoned for using copper tube and copper sheet in the manufacture of water-heaters and geysers which were not for the purpose of any contracts or orders certified to be within Classes "A" or "B," Circular L33, as to the Control of Output issued by the Minister of Munitions. Defendants pleaded guilty, and were fined £100 and costs.

Mr. HURST, who prosecuted at the instance of the Ministry of Munitions, explained that last December, owing to the scarcity of the metal, a stringent order was made restricting the use of copper in the manufacture of articles for private trade. After the issue of the prohibition order, the Minister of Munitions noticed an advertisement in the "Ironmonger" relating to the sale of water-heaters the manufacture of certain parts of which involved the use of copper. The Company were asked for an explanation of the circumstances; and they at once gave the information asked for in the fullest way. They stated, on Feb. 19, that subsequent to the date of the order 111 orders had been executed which entailed the use of copper; and in respect of 30 of them the necessary certificates had been obtained. Seven of the remaining orders were completed from stock. While, added Mr. Hurst, most firms using copper in this country could only get permits from the Ministry of Munitions in one application out of a hundred, the defendants executed orders without the slightest attempt to get a certificate, though they must have known from the fact that they received 30 certificates that they were absolutely necessary.

Mr. F. E. SMITH, on behalf of the defendants, said they regretted very much that they should have infringed the order. The copper that was used in the supply of the articles came out of their stock, and had not been purchased since the issue of the order. It was used for orders received prior to Dec. 8 [the date of the order]. No doubt if the defendants had properly appreciated the order they ought to have asked for certificates to cover the orders received; but they had an impression that, as a result of representations made by a number of trade associations, there would be some modification of the order. The fact remained, however, that they had been proved to have disobeyed the letter of the law. They also were aware that articles supplied to gas companies and to plumbers were being used in the interest of the national service; and they thus thought they were acting within the spirit of the Munitions Act. What they ought to have done was to ask for a certificate to cover orders which they already had on Dec. 8. The defendants had furnished the information on which the proceedings were taken. Although they had disobeyed the letter of the law, he submitted that nothing really blameworthy had been done.

The STIPENDIARY said he regarded the case as a very serious one. Defendants must have known what was required of them, inasmuch as certain certificates came into their hands. It looked very much as if in the other instances they knew they would not get the certificates if they asked for them.

A fine of £50 was imposed in each of the two cases. Costs were allowed of £5 5s. in each case, making the total penalty, with Court fees, £112. Other summonses were withdrawn.

Measurement of Natural Gas Purchased in Bulk.

A decision of the Pennsylvania Supreme Court, confirmed on appeal, as reported in the "Gas Age," is to the effect that natural gas sold by a landowner, under a lease providing for royalties on the quantity metered at the head of the well, but silent as to the pressure at which such measurement should be made, assumes the same to be the line pressure, and subject to any variations that may obtain from time to time. The owner alleged that the local custom was to correct the bulk to a pressure of 8 in. above atmosphere, and applied for disclosure of the daily pressures on the inlet of the meter, to admit of such adjustment of the quantity to be paid for. But the company denied the existence of any custom, and contended that the true meaning of the stipulation for measurement at the well, without other conditions, was that the bulk should be taken at the line pressure for the time being. The practice of expressly stating 8, 10, or 16 in. pressure in agreements was admitted. The Court held that there was no evidence on which any particular pressure could be assumed in a contract containing no specification as to the same. This interesting precedent should be noted by all concerned, in the purchase or sale of gas at pressures that materially affect the bulk, as compared with that at atmospheric pressure.

MISCELLANEOUS NEWS.

CROYDON GAS COMPANY.

The Half-Yearly General Meeting of the Company was held last Friday, at the Offices, Katharine Street, Croydon—Mr. CHARLES HUSSEY, J.P., in the chair.

The SECRETARY (Mr. W. W. Topley) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

INCREASED CONSUMPTION AND WORKS' PLANT.

The CHAIRMAN, in moving the adoption of the report and accounts, said, in common with the majority of gas undertakings, in and around London at all events, the Company had to record a very substantial increase in the sales of gas during the half year, amounting to no less a quantity than 76 million c.ft. The prolonged cold weather in the early part of the year accounted for much, but not all, of this; and they were now maintaining a rate of output well above that of last year. Such evidence of the growth of the business was, of course, gratifying; but so near were they to utilizing all their resources of manufacture that there had been times when they would gladly have seen a somewhat lessened output day by day. The coming winter, if the weather proved as inclement as that of the last, would call for all the energies of their Manager at the works and of the assistants and workmen there. Particularly felt had been the lack of the new gasholder which, but for the war, would have been in use some two years ago. The shortage of storage not only made the working in the winter difficult, but also less economical to an extent which, though not directly measurable, was yet considerable.

SUSPENSION OF THE FIXING OF GAS-FIRES.

With these facts in mind, the proprietors would not be surprised that the Directors decided last autumn, as a matter of considered policy, to suspend largely for the present the activities of the Company in adding to the number of gas-fires in use in the district, and to cease letting any additional fires out on hire till more favourable times came round again. It would be seen from the report that the increase in stoves for the half year was less than they had been accustomed to, being only 751, of which 565 were represented by sales, and 186 only by additional stoves hired. The cost of gas-stoves now was very high, as was that of fixing them; and he believed it was a good policy to defer the continuance of their efforts to increase output in this direction until it represented a less heavy addition to capital expended than it would do under present conditions.

INCREASED EXPENDITURE OVERBALANCES INCREASED REVENUE.

On both sides of the revenue account would be noticed, as was to be expected, large increases as compared with last year. There was an increase of £22,000 in the cost of coal and oil, while sales of gas had produced £23,000 more. Last half year, foreseeing the heavy charges they would have to bear for raw materials, the proprietors would remember that the Directors carried forward as a reserve under this heading the sum of £7500, which had now been used up. Allowing for this, and for the fact that in the June half of 1916 they carried forward to the December account the sum of £5000, it would be seen that the real added cost for coal and oil in the half year exceeded by £11,500 the increased receipts from gas. This was partly offset, it was true, by an increase of £7500 from residuals. He might say that the whole of the sulphate of ammonia the Company produced was now being used for home agricultural requirements. But the profits had, under the heads he had mentioned, been adversely affected, notwithstanding the increase in gas sales (in normal times a source of increased profit) to an extent of £4000 in the half year. It would also be observed that a very substantial increase had been made in the charges under the head of war bonus and allowances to dependants of men on service. These items of expenditure they would not, he was sure, grudge to the employees. They were amply deserved. In all, 260 employees had joined the army or navy; and he regretted to say that of these sixteen had lost their lives. But the proprietors must not lose sight of the fact that these charges had to be met. Many of their neighbours among gas companies had found it necessary recently to make substantial additions to their prices for gas—up to as much as 8d. per 1000 c.ft. The Directors would, if forced to raise the price, do it most reluctantly, and to as small an extent as they deemed compatible with safety, and not earlier than circumstances necessitated. Nevertheless, if freights continued to rule as high as they now were, they might have no option but to raise the price. He was glad to say they had received information that day that freights were decreasing. They all hoped it might be so; for freights had been at an abnormal rate for a long time.

HAMPERING RESTRICTIONS AND CONTRADICTORY DEMANDS.

In many ways they had been hampered in their efforts to work economically by Governmental restrictions and requirements. In times like these, they would not, he was sure, wish to complain of this, nor to be too critical as to the wisdom of the varying and occasionally contradictory requests and demands made upon them. He doubted if the many special services the gas industry had rendered, and was rendering, to the country were anything like adequately understood, even by the shareholders in gas undertakings. Certainly when the whole history of the war came to be told, it would be seen that the value of the industry to the country had been far greater than any of them could have foreseen three years ago. The tar dehydration plant, completion of which was promised for March of last year, had been in operation during this summer, and, so far as could at present be judged, was giving satisfactory results. A debenzolizing plant, for recovering from the gas certain constituents urgently required for military needs, was now, they hoped, nearing completion, though long overdue.

MINIMUM BONUS AND A CONTRIBUTORY PENSION FUND.

Reference was made in the report to the fact that a contributory pension fund had now been established. This would assure to all the co-partners what had for thirteen years been assured to the staff—namely, that, if they remained in the Company's service until no longer able to work, they would have a retiring allowance proportioned to their wages and length of service. They had also revised the co-partnership scheme to the extent of providing for a minimum bonus of 4 p.ct., part of which was earmarked as the co-partners' contribution to the new pension fund. This was a novel departure in the co-partnership scheme, but one, he hoped the proprietors would agree, fully warranted by the exceptional, and unforeseeable, circumstances brought about by the rise in the price of all commodities, including the raw materials of their business.

AN EXHIBITION AND REMEMBRANCE.

The good feeling among the employees was shown in a pleasing manner a few days ago when an exhibition, organized by themselves, was held as a competition among allotment holders, and to add to a fund raised by weekly contributions among them, for the purpose of sending periodical reminders to their fellows in the army and navy that they had not been forgotten by their colleagues at home. He was pleased to say the proceeds of the exhibition amounted to £21; so that there would be more money to spend on sending gifts to their men at the front than there had been in the past. The show was a most successful one, of over 500 exhibits, and supplied an afternoon's interest which he, with several of his fellow Directors, most thoroughly enjoyed. Such rivalry was a healthy and friendly one—financially too, thanks to the kindness of Mr. Hooker in selling the exhibits by auction at the conclusion of the afternoon, the fund he had mentioned was, as he had said, considerably helped.

REDEEMABLE MORTGAGES.

To return to the financial affairs of the Company the Directors issued in May £10,000 of redeemable mortgages. The issue was largely over-applied for; but they could only obtain the sanction of the Treasury to the issue of this small amount.

THE FINANCIAL RESULT.

The dividends the Directors recommended the proprietors to declare, at the statutory rate, would absorb about £1300 more than the net profits of the half year; but, as they would see, the carry-forward would be a substantial one.

The DEPUTY-CHAIRMAN (Mr. Thomas Rigby) seconded the motion.

A DELEGATED ISSUE.

Mr. CHARLES WEBB asked what was the expense of issuing the £10,000 of redeemable mortgages.

The CHAIRMAN: The amount was only a little over £100.

Mr. WEBB said he could not help wondering, when the Directors placed this stock outside to issue, why they were not capable of issuing such a small amount from the office, so as to save whatever expense would be incurred. He thought the Company were quite capable of placing the stock from headquarters. The South Metropolitan Company were issuing £250,000 of redeemable preference stock from their office; and he was sure it would go off like hot rolls.

The CHAIRMAN said they could not issue the stock without some expense; it had to be advertised, tender forms issued, and so on. This accounted for a considerable part of the expense. They went to Mr. Richards, who had a good reputation among gas investors.

Mr. WEBB said he was not discussing the matter from that point of view. It was only that it struck him the expense might have been saved.

Mr. RODMAN: Mr. Richards might get people to pay a bigger price than the Company. He has a large connection.

Mr. A. W. OKE: We can congratulate the Board on the successful issue of the stock, and the nominal rate at which it was issued.

The CHAIRMAN remarked that the Company had themselves on many occasions, when times were good, issued debentures. But these were peculiar times; and, in the opinion of the Directors, the way the stock was issued was the best under the circumstances.

Mr. HENRY FIELD remarked that he noticed the unaccounted-for gas was nearly 43 million c.ft. This appeared to be rather high.

The CHAIRMAN replied that one half year was very light, and the next very high. The unaccounted-for gas had that peculiarity. If they looked at the previous half year, they would see the item was very low. It was low even now compared with other gas companies. If, too, they took the meters one day less than another, it made a good deal of difference. The average for the Suburban Companies last year was 6·59 p.ct., and that of Croydon was 3·7 p.ct. Their average for this year was 5 p.ct.; so that they were now even better off than the other Suburban Companies. He trusted this was satisfactory.

The motion was unanimously carried.

THE DIVIDENDS.

Mr. HENRY WOODALL proposed the declaration of dividends at the following rates per annum, less income-tax: 14½ p.ct. on the "A" stock, 11½ p.ct. on the "B" and "C" stocks, 5 p.ct. on the "D" stock, and 10 p.ct. on the "E" stock. He remarked that he was quite sure the proprietors would all feel the results of the half year were very satisfactory, and that they were very fortunate in being able to pay the full statutory rates of dividend, and at the same time add nearly £2000 to the charges for repairs and maintenance. Of course this was very necessary, in times when the costs of materials and labour were so high as now, and when there was difficulty in getting customary work carried out. Then they had an additional item in the contribution of £382 to the Co-Partners' Pension Fund. Further, the war bonus and payments to the dependants of men on war service had increased by nearly £5500. When they considered all these items, and noticed that the carry-forward had only been reduced by £1300, and still remained at the satisfactory figure of £11,444, he felt sure the proprietors would feel the financial position of the Company was a very sound and good one. In a sense, he supposed he was the technical gas man on the Board; and he should like to tell the proprietors that he had had the pleasure of going round the works with Mr. Caddick; and found them, as he always did, in most excellent condition. Further, he should like the proprietors to know that everything was well in preparation for the winter's work. This was most important. As the Chairman had told them, the increase in the sales of gas was very heavy; and they must have every bit of their plant in the best possible state to meet the

increased demand that they were certain to get. It spoke well for the forethought of the Engineer that he had got everything in such good condition; for, with the best intention, it was very often very difficult to get work done at all now.

Mr. Percy H. Hall, in seconding, said he should like to say that Mr. Cash, who usually proposed this resolution, had written regarding his inability to attend. He had been rather overworked; and it was thought another week's holiday would be a great advantage. Mr. Cash hoped he would be excused on this occasion.

The motion was unanimously carried.

Votes of Thanks.

Mr. Charles Webb proposed a vote of thanks to the Chairman and Directors for their continued good management of the affairs of the Company. He was sure there was no body of gentlemen more deserving of thanks than those who were at the present time connected with the management of the affairs of gas undertakings. The times had for them been most anxious and strenuous; and when Directors were, under such circumstances, able to give them dividends such as their Directors were doing that day, it was extraordinary.

Mr. J. T. Maitland seconded the motion, which was very heartily adopted.

The Chairman, on behalf of his colleagues and himself, thanked the proprietors for the vote. The times had been anxious; but he was glad to say they were, as Mr. Woodall said, well prepared for the most difficult part of the year's work. They had not the same anxiety regarding coal as they had this time last year; for they were getting in a good stock for the winter. The Chairman proceeded to propose a vote of thanks to the officers, staff, and workmen, for their efficient services during last half year. It was not every company that possessed such good officers, staffs, and workmen as they did. They were all doing their best in the interest of the Company, and were trying to cement the good feeling that had existed between their men and themselves for so many years. He was sure the proprietors would agree with him that what had been done in altering the co-partnership scheme had been a wise policy. In returning thanks to Mr. Caddick, Mr. Topley, Mr. Sandeman, and those assisting them in all departments, as well as the workmen, they must not forget their women workers, who were working exceedingly well under their new conditions.

Mr. Samuel Spencer seconded the motion.

Annual Meetings Opposed.

A Proprietor suggested that the Company should follow the example of the great banks, and now hold annual instead of half-yearly meetings. This would save the staff a large amount of trouble, and the Company expense in printing.

Mr. Oke said there were two sides to this question. Proprietors must watch very carefully these points. He was sorry to say—of course, he was speaking generally—that some of the safeguards of stockholders in joint-stock companies were being kicked away. People seemed to scarcely realize what it meant when half year by half year the stockholders of gas companies were called together. He looked upon these meetings of shareholders as safety-valves; and if there were any points the proprietors wished to bring before the Board, this could be done at these meetings. He urged them not to give up any of their rights. They hardly knew what was possible in many companies. It was actually possible for a man to have a seat at the Board, and also be solicitor to the Company, and so occupy a position of profit. Why were these things possible? Because shareholders of companies were actually going to sleep; and they did not watch Parliament making changes of this kind which removed safeguards.

The Chairman said in their case they could not hold annual meetings in place of half-yearly meetings without authority in an Act of Parliament. It had been the custom to hold half-yearly meetings, and was it worth while disturbing this custom, and going to the expense of an Act of Parliament to do it? ["No, no."]

Replies of Officers.

Mr. A. Caddick said, on behalf of the staff and all engaged in the manufacturing department, he should like to express their thanks for the kind way the Chairman had proposed the vote of thanks. He was sure the vote itself would be particularly welcome at this time, surrounded as they were day by day by difficulties, which seemed to increase rather than diminish. He felt the words that had been used would be an encouragement to all concerned. He could not say too much for his staff, and for the way the workmen had helped him during the half year. They had before them a very difficult winter to face. As the Chairman had intimated, the consumption of gas was largely increasing. Up to the present time, from July 1, the increase had been 11 p.ct.; and there was the possibility of a larger increase in the colder weather, with no additional apparatus to bring into use. From this it would be understood they were going to have a very anxious time next winter. But with confidence in the good feeling and assistance that were the vogue at their works, he believed they would get through. They were increasing the coal stocks, and they hoped to continue to do so up to the end of September, when no doubt they would be in the same position as last year. With regard to oil, the position was not so satisfactory. The Government had stopped supplies; and, although the Company had some oil in stock, there was not enough to last them through the winter. He hoped the application he had made to the Explosives Supplies Department of the Government would bring them a portion of their winter's supply. He thanked Mr. Woodall for the complimentary remarks he had made as to the works. The struggle to get the work forward for next winter had been very severe. Most of their work was, he was happy to say, completed, or would be in a week or two; so they would face the winter with the plant in good condition.

Mr. Topley also replied for his staff, remarking that he knew from his day-by-day observations how thoroughly well the vote was merited by those who did the routine work. The Company were well served; and the Company deserved to be well served. The proprietors who had been in the Company for any length of time knew that the Directors had always considered the true interests of those who served the Company as one of their first objects of concern. With reference to the step that was taken during the half year, and approved by the propristors that day—the establishment of the pension fund—he felt sure, although a small beginning, in years to come it would be found to be one of the most beneficent things the Directors had ever done both for the employees and in the permanent interests of the Company. As to the suggestion that an annual meeting instead of the half-yearly meetings should be held, he appreciated the wish to lighten his burdens. The change would save a certain amount of labour; but any saving of expense would be considerably less than might be supposed. A great deal of the work connected with the half-yearly meetings would still have to be done whether or not they were held.

Mr. W. J. Sandeman, on behalf of the distribution department, also acknowledged the vote. He was sure it was thoroughly well deserved. One and all of his staff and men had done their best under the trying conditions of the half year.

BOURNEMOUTH GAS AND WATER COMPANY.

The Ordinary General Meeting of the Company was held last Friday, at the London Offices, No. 90, Cannon Street, E.C.—Mr. G. Crispe Whiteley in the chair.

The Secretary (Mr. H. A. Plumb, F.C.A.) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

An Unavoidable Absence.

The Chairman, in moving the adoption of the report and accounts, said he was sorry to be absent from the last half-yearly meeting. He had no choice in the matter. It was not even a question of the doctors. He simply could not move; and therefore he could not be with them. It was the first time, since he had had the honour of occupying it, that he had been absent from the chair; and probably it was the first time he had ever been absent from a Board meeting since the prehistoric times when he was appointed a Director. This was only a prelude to thanking his colleague, Mr. William Cash (who unfortunately had himself broken down in health and was not able to be with them that morning), very heartily and sincerely for the full financial statement he made at the last meeting.

The Ups and Downs of Gas Management in War Time.

With regard to the report and accounts, they were, in his opinion, of a most remarkable character. Never in the history of the Company had their anxieties been heavier, the changes more fitful, or the dangers and difficulties that had surrounded their work greater than during the last six months, and never, let him add, had their troubles been more bravely met or earnestly dealt with or successfully grappled than they had been by their Acting Manager (Mr. Moon), and the excellent staff with which he was surrounded. He did not propose to go into all the ups and downs which were now constantly occurring for any Board who had to deal with the affairs of a gas company. Buying coal and getting it to Bournemouth had been a matter of great difficulty. The same could be said of oil. The different policies of the Government also had to be met. He proposed to give the proprietors a few of the essential figures out of the accounts, and mention some interesting events that had happened during the half year. At the same time, he should wind up, as he generally did, by congratulating the proprietors, in spite of the vicissitudes, upon the present position of the Company, and showing hopeful prognostications to the proprietors and the worker co-partners when the period of war ceases.

The Accounts Examined.

Coming to the capital account, they had issued no fresh capital during the half year; but they had expended £2754. On the other hand, they had written-off for depreciation £8019, which gave a balance of £5264 in excess of expenditure. The increase of revenue had been of a satisfactory character; the receipts for gas being £11,402 over the receipts for the corresponding period of 1916, or an increase of 14 p.ct. Taking it on the quantity of gas sold, it was about 11¼ p.ct. The increase in the percentage on money value was owing to the advance in the price from Lady-day of 2d. per 1000 c.ft. It would perhaps bring the meaning of this increase home to the proprietors more clearly when he said that, in order to satisfy the consumers, they had had during the half year to make 705 million c.ft. of gas, compared with 555 million c.ft. in the corresponding half before the war. In water revenue they had a small increase of £270, or 1 p.ct. As to the residuals, they might be considered as fairly satisfactory. There were, in regard to them, only two points he wished to mention. The first was the difficulty of getting rid of the surplus tar; and the second was that, owing to the limitation by the Government of the price of sulphate of ammonia, the restriction put upon its export, and the increased cost of sulphuric acid, the profit had been distinctly limited. On the other hand, all these steps had popularized sulphate with their farmers, which, he thought, showed that the makers had a great benefit to which to look forward in years to come. Taking the half-year's revenue, they had an increase of £15,203 which was extremely satisfactory, and if it stood there, he thought they could exult. However, so far so good. But, on the other hand, they had a large increase in the expenditure. In getting coal and oil, they had had to spend an extra £19,389, which, it would be seen, more than swallowed up the nice increase of revenue. Taking the whole revenue charges, they were £133,711, as compared with £114,120 in the corresponding half of 1916, or an increase of no less than £19,590. If they deducted the increased revenue of £15,203, they got the result of a decreased profit of £4387, which he thought was a small amount considering the trouble they had been through. Of course, it would have been much larger if they had not had the increase in the price of gas from Lady-day. But still it was moderate enough under the circumstances; and they were able by slightly reducing their carry-forward to pay the statutory dividend. There they had the whole thing in a nutshell.

The Loss of the S.S. "Corbet Woodall."

Coming to the events of the half year, by far the most important was the loss of the s.s. "Corbet Woodall." Built for the Company's ser-

vice some eight or nine years ago, and bearing a name of honoured memory, it had been busy bringing coal from the Tyne and the North during the whole of its life—doing its work thoroughly satisfactorily and well to the, in every sense, great advantage of the Company. It was lost on May 30. He need not tell the proprietors how, why, and by whom. That went without saying. But the first thing he might thankfully and gratefully say was that no lives were lost. He was not surprised over the loss of the boat. In fact, he had been thinking, with fear and trembling, each half year as to how soon it would go, running the risk that it did. They must, however, be thankful for what it did. It was the mainstay of the Company's coal supply; and no doubt its loss would tend to increase the working expenses of the Company. They could not get another boat—certainly at the present time, except at a prohibitive cost, although they were inquiring and doing their best. Meantime, they were getting an excellent coal supply by rail; and the result was that their present coal stock was most satisfactory. The changes of carbonizing methods and gas-works policy which were foreshadowed by the Ministry of Munitions would undoubtedly call for an increased supply of coal; but if the Government called for this increase, they would unquestionably give them the necessary help to provide it, and the situation would thereby be relieved.

RISE IN THE PRICE OF GAS.

But when they considered the loss of their steamer, the rise in wages, and the price of coal and oil, the Directors were compelled, much to their regret, to announce another rise in the price of gas from July 1. They did not apologize for it; and he was sure their consumers were ready to receive it, however much they might regret having to pay it. They were not surprised. At the same time, what the Company were doing now in this respect, many important companies did long ago; and as this Company were the last to raise the price of gas, they would be the first to lower it as soon as they saw their way clear to do so.

SHELLS AND MOTOR FUEL.

Then they were still making shells for the Government, and were employing 80 p.ct. of women for doing this work; and they were doing it thoroughly well, as, indeed, were the women employed in the general work of the Company. The Company were also using gas for motor vehicle purposes, and were thereby reducing the consumption of petrol. This was being done in a most satisfactory way—in fact, they had the privilege of claiming to be patriotic in this matter, and at the same time saving the Company expense.

A MINIMUM BONUS AND A PENSION SCHEME.

Although he would have to deal separately with the matter a little later at the special meeting, he should like to say a few words with regard to their co-partnership scheme, of which they had always been very proud. They were one of the earliest companies to start it, following Sir George Livesey's lead; and they could claim that it had been a great success. The idea of giving the workers a share in the profits, so encouraging their thrift, and making as many of them as possible shareholders (the workers now held 1000 shares in the Company) had been followed by the best results. He could assure the proprietors that the annual meetings he had had the privilege of attending now for some years, at which he addressed the whole of the staff, had supplied him with one of the best and most pleasant duties that anyone in his position could possibly wish to carry out. But when the scheme was framed, they did not, and could not, anticipate the extraordinary convulsion that had taken place. The war, coming in as it had done, had destroyed and upset all their calculations with regard to the scheme. The present rise in the price of gas from July 1 absolutely banished the whole of the bonus of the co-partners. Strictly speaking, those who gained by the profits of the Company ought to be prepared to lose when the Company was not so prosperous. But they were not bound by logic. He thought it was Disraeli who said: "A country could not be governed by logic." And the Directors, after full consideration, thought they ought to recognize in some shape or form that the co-partners were in no way responsible for the war or for the changes that had occurred; and nothing they could possibly have done could have prevented it. Under these circumstances, in pursuance of the principles the Directors had always followed, they proposed two amendments. The first was that a minimum bonus of 4 p.ct. should be granted; and the second was that, as they were granting this bonus, they should take the opportunity of framing a complete pension scheme, which they had always wanted to do, and which had always been in the air to carry out when they could possibly effect it. Of course, they had always given a small pension to old and faithful servants, as they would always do. But the advantage of having a complete pension scheme was extremely great. He could assure the proprietors that their workers fully appreciated this when he spoke on the subject at the annual meeting. To receive a fixed sum which would be higher than any pension that probably they would have originally given, instead of an uncertain allowance dependent upon the whim or caprice of anyone, was a sounder and a stronger position for the workers to be in. It was a position they most fully and thoroughly appreciated. To have a Company of the position of their own guaranteeing the solvency of the scheme was also a very important matter indeed. In a few minutes he would be proposing resolutions to ratify these changes; and he had no doubt the proprietors would support the Board in making them.

THE POSITION AND THE FUTURE.

He said early in his speech that he would end by congratulations. He thought he could do so, because, after all was said and done, he doubted whether there was any industry in the world that had gone through a similar six months of such difficulty as they had passed through, and had produced such accounts, resulting in the payment of such a dividend. Regarding the future, they had a great deal to which to look forward. The war could not last for ever; and in the future, although they would not get back to normal times (he did not suppose they would ever get back to pre-war times), their customers would have got accustomed to the use of gas for the many and varied purposes for which they had never employed it before; and they would feel the comfort of its use. New developments were arising—such as the consumption of gas for motor power—and would continue to arise. He could not but anticipate, and did anticipate most thoroughly, that in the future they would be able to do even better than in the past, and that they would have greater and greater strength to go on to further triumphs.

Mr. A. W. OKE, in seconding from the shareholders' side of the table, expressed the pleasure of the proprietors at seeing the Chairman again in his accustomed place. All the proprietors too shared in the regret that Mr. Cash was unable to be with them. As to the report it reflected the atmosphere of Bournemouth. It was a fine report. The fact that the new increase in the price of gas was only 6d., and the previous increase only 2d., spoke volumes, he thought, for the careful policy that had been pursued in the past. He was glad that the Directors had taken the opportunity of making special provision for the co-partners in the present unlooked-for circumstances. It seemed to him there was justice in the suggestion; and he felt sure it would be particularly welcomed by the proprietors.

THE OSCILLATIONS OF GOVERNMENT DEPARTMENTS.

The Right Hon. Sir DANIEL F. GODDARD, M.P., said the Chairman had asked him to follow his speech, and to fill up any interstices that might arise. But he could not find any. The natural increase in the expenditure of a gas undertaking was entirely or largely dependent upon that part which was devoted to manufacture. Coal, oil, and wages were the items which were responsible for the chief increase of expenditure; and the proprietors knew that, under present circumstances, the Directors could not help this. They were things they could not control. There was one other item which showed a marked increase. That was war relief, which had risen from £800 to £1312. The proprietors knew what this meant. It meant they had men fighting and must make them allowances; and they must look after their families. Nobody could find fault with that. As one who had been through the experience of a practical gas maker, he was struck by the difficulties that the engineer and manager of a company like this had to encounter under the present circumstances. No one who had not been through similar experiences could know what it meant. The balance-sheet revealed to them very little of what these difficulties were—always having to be on the *qui vive*, always having to meet the new points that arose, always having to keep one's mind upon new appliances, and all that sort of thing. It was really a very trying thing for their Manager. Their Chief Engineer was still away; and the burden of the work throughout this time fell upon their Acting Manager; and he thought it was only right that the proprietors, as well as the Directors (who were constantly in touch with Mr. Moon), should realize how much they were indebted to him and the staff for facing the difficulties in the way they had done. The Chairman had alluded to many of these difficulties; and he had mentioned the changes in the policy of the Government. One could not at first realize what they meant. He called them something more than changes; he called them oscillations, because these Government Departments did not seem to know their own minds about these things—they did not seem to look forward enough. One day they came down and said: "You must use as little coal as you can, and dilute your gas with 20 to 25 p.ct. of water gas." The Manager at once set to work to adopt the necessary means to comply. Before he had hardly done this then there came another order: "We want more liquid fuel for our Navy, and you must use more coal and every available retort, and make less gas per ton. It does not matter what you do so long as you use more coal, and get more tar." Then the Engineer had again to set to work to see how he could alter his process. These were what constituted difficulties to the men who were responsible; and when the proprietors remembered that, notwithstanding these difficulties, the Company were going on making profits (although they could not exactly pay the dividend out of the half-year's profits, fortunately they had enough and to spare from past years), they realized how much they owed to the Manager and those who assisted him.

The motion was unanimously carried.

DIVIDENDS.

Moved by the CHAIRMAN, and seconded by Sir CHARLES J. JESSEL, Bart., dividends were declared at the following rates per annum, less income-tax: 6 p.ct. on the preference shares, 7 p.ct. on the "B" ordinary shares, and 14 p.ct. on the original shares.

Extraordinary General Meeting.

THE MINIMUM CO-PARTNERSHIP BONUS.

An extraordinary general meeting was then held to consider certain alterations and amendments in the rules governing the Company's profit-sharing scheme, and a scheme provisionally approved by the Directors for the formation of a pension fund for the co-partner employees.

The CHAIRMAN, in moving the first resolution with regard to the payment of a minimum co-partnership bonus, said he was sure the proprietors would agree to this. It was impossible to allow the whole thing to fall through by not giving anything at all, although, strictly speaking and (as he had said) logically, if the men took the good, they should also take the bad. But they could not look upon the workers exactly in that light; and so the Directors thought it well to establish a 4 p.ct. minimum bonus. Under the new arrangement, for the year commencing July 1 last, the distribution of the bonus would be calculated on the following scale: If the price of gas in the Bournemouth district was at or above 2s. 10d. per 1000 c.ft., a bonus of 4 p.ct.; at 2s. 9d., 5 p.ct.; at 2s. 8d., 6 p.ct.; at 2s. 7d., 7 p.ct.; at 2s. 6d., 8 p.ct., and so on. The effect of this alteration, the proprietors would see, was to ensure a minimum bonus of 4 p.ct.; but the standard for any bonus in excess of 4 p.ct. would remain the same as the rules now in force. It was also necessary that the wording of Clause 5 of the Co-Partnership Rules should be amended. This alteration was to enable that two-thirds of the minimum bonus of 4 p.ct. could be applied *pro tanto* in payment of the co-partners' contribution to the proposed Co-Partners' Pension Fund. Under the former wording of Clause 5, one-quarter only of the bonus would have been available for this purpose; and the alteration was necessary to enable the rule governing the co-partners' own contribution to

the Co-Partners' Pension Fund to be carried into effect. Apart from these alterations, it was not proposed to, in any way, amend the co-partnership scheme; and it was hoped that all co-partners, both present and future, would, in due course, be entitled and become shareholders in the Company.

The Right Hon. Sir Daniel F. Goddard seconded the motion, which was unanimously agreed to.

The Pension Fund.

The Chairman said they now came to the pension fund, the salient features of which were: The fund would come into operation upon Sept. 1. All co-partners under 50 years of age on Sept. 1 this year were eligible. All employees admitted as co-partners on or after Sept. 1 this year would thereby become members. Members under 30 years of age at the date of joining would contribute 3 p.ct., and members of 30 years and over, 4 p.ct., on a sum equal to the amount of salary or wages. The contribution would be paid one-third in cash at the time of paying salary or wages, and two-thirds by transfer from the free portion of the co-partnership account—*i.e.*, the bonus from time to time placed to his credit. Co-partners who, on Sept. 1, this year, were 50 years of age or upwards, might contribute 4 p.ct., but the Directors would decide what pension should be paid having regard to all the circumstances of the case. The Company would guarantee the solvency of the fund, and would contribute half yearly a sum equal to the sum contributed by the contributing members, and would bear all expenses connected with the fund. The Directors of the Company, for the time being, were to be trustees of the fund. No pension would be paid for ten years from the commencement of the fund; but, in the event of the death of any member before he receives a pension, a sum equal to double the amount of his contribution (without interest) was to be returned to his representatives. In case of voluntary resignation or dismissal other than for fraud or dishonesty, a member leaving the service of the Company would receive the whole of his own contribution, with 4 p.ct. compound interest. A member attaining 65 years of age would retire (unless by mutual agreement he continued in the service of the Company), and took the pension to which he was entitled. The pension to which a member would be entitled would be one-sixtieth of the salary or wages he was receiving at the date of his retirement for each completed year of service with the Company, with a maximum of forty-sixtieths—*i.e.*, two-thirds of such salary or wages. As examples, a member, with 40 years' service at the age of 65, would receive for each £100 of salary or wages a pension of £66 13s. 4d.; a member with 30 years' service at the age of 65 would receive for each £100 of salary or wages a pension of £50; a member with 20 years' service at the age of 65 would receive for each £100 of salary or wages a pension of £33 6s. 8d., with proportionate pensions for intermediate periods and amount of salary or wages. No member was entitled to claim his pension before attaining the age of 65 years, and completing at least ten years' service. The scheme was framed on a liberal scale; and it was received with great approval by their workpeople. He moved its adoption.

Lieut.-Col. Charles L. Morgan seconded the motion, which was unanimously carried.

Votes of Thanks.

The Chairman proposed a hearty vote of thanks to the staff—Mr. Moon and Mr. Plumb particularly as representing the different branches—for the excellent service rendered during the past half year. The Company were splendidly served; and he should like the workers to feel that their services were recognized very deeply by the proprietors as well as by the Directors.

Mr. F. G. Barrett seconded the motion, which was heartily passed.

Mr. Philip G. G. Moon thanked the proprietors very cordially on behalf of the officers and workmen at Bournemouth. Although, he said, the difficulties had not been less, fortunately the loyal and efficient co-operation of everyone had enabled them to successfully surmount the difficulties up to the present. They were a very happy family at Bournemouth; and they felt they had an extremely appreciative Board and an extremely appreciative set of proprietors. There was nothing that enabled one to work with more zeal than the knowledge that one's efforts were appreciated; it turned what might be a very trying business into a labour of love. The loss of their ship the "Corbet Woodall" was felt very much by them at Bournemouth. They got to like the old ship; and they knew only too well how much they owed to her successful running during the first two years of the war. Even this cloud had a silver lining. Better railway deliveries commenced almost simultaneously with the loss of the boat, and they had been able to get quite a good stock of coal together; and, so far as they could judge at the present moment, the winter supplies were not going to present too much difficulty. With regard to their friends at the front, they had some 300 of their people serving with the Colours. He had heard from Lieut.-Col. Woodall; and with him it was still the same story. He was still carrying-on well, but still longing to get home and to his old duties again. They had unfortunately lost seven of their men. One of their men—their Bournemouth showroom manager, Mr. Richardson—was now a captain, and had received the Military Cross, of which they were all very proud. As to the co-partnership minimum bonus and pension scheme, he was sure it would do more than anything that had happened in the past to bind their workers to the Company with the bonds of mutual good fellowship in perhaps the troubled time that labour might have to pass through in the years to come.

Mr. Plumb said that it was always a pleasure to rise in response to a vote of thanks to one self and one's staff. The difficulties of the situation fell more upon Mr. Moon than himself. But the accounts that had been submitted showed they had intelligently anticipated what the effect of the rise of coal, oil, wages, &c., would be. They had had to budget in advance. They did not want to raise the price of gas to inflate the profits, and probably have to pay excess profits tax. On the other hand, they did not want to leave the price of gas alone until they showed a big loss. If they took the accounts presented that day, he thought they would compare very favourably with the accounts of all gas companies over the whole of the country. They had had to increase the price by 6d.; and they believed this would cover the increased costs. He was sanguine the price would be reduced as quickly as possible, and consequently the dividend to the proprietors would be proportionately increased again.

Proposed by Mr. Barrett, seconded by Mr. Oke, and supported by Mr. Charles Webb, a hearty vote of thanks was passed to the Chairman and Directors.

The Chairman responded on behalf of his colleagues and himself; and this concluded the meeting.

PORTSEA ISLAND GAS LIGHT COMPANY.

Moving the adoption of the report reproduced on p. 290 of the "Journal" for the 14th inst., at the recent half-yearly meeting of the Company, Mr. R. Edgcombe Hellyer (the Chairman) said that the total quantity of gas sold in the six months ended June 30 was 745 million c.ft., which was 23 millions in excess of the quantity sold during the corresponding six months last year. So that, notwithstanding the abnormal and adverse condition, the growth of the business continued, and the demand for gas was well sustained. The profits for the half year ended December last were insufficient to pay the dividend by £8987; and the carry-forward was consequently reduced by this amount. In commenting on the accounts at the February meeting, he said that, owing to the further increase in the price of coal and oil, the deficiency would be greater for the then current half year—*i.e.*, to June 30—but that the Directors would meet the shortage out of the reserves, rather than penalize the consumers and shareholders by increasing the price of gas before they were compelled to do so. In the half year ended June, 1916, the gross profits were £20,033. In the half year ended June, 1917, instead of a profit, an actual loss of £12,723 was incurred, a difference of £32,756 between the two half years. This result was clearly foreseen by the Directors; so that it need give the shareholders no anxiety as to the Company's financial stability. On the contrary, it was the thoroughly sound financial condition which justified the Directors in deciding to bear the loss rather than increase the price of gas. To meet this loss, and to provide for the dividend at the statutory rates, the carry-forward of £10,356 had been entirely absorbed, and £20,373 had been transferred for the reserve fund, which had been further reduced by £5853 depreciation in the value of investments. In comparing these different items of expenditure with last year's charges, it must be borne in mind that an additional 63 million c.ft. of gas had been made durnig the period. Apart from wages an additional £35,353 was spent on coal and oil; but only £4604 extra was obtained from residual products. The net increased cost of raw material was therefore £30,749; and £5417 more was paid in salaries and wages, making together £36,166. The increased quantity of gas sold to private consumers produced an extra £5580; but owing to the temporary discontinuance of the majority of the street-lamps, the receipts from public sources were £943 less. The position was carefully reviewed in April; and the estimate then made was surprisingly near the actual result of the half-year's working. It was estimated that the difference would be about £11,000; and as a matter of fact it was just over £12,000, which was accounted for, to a great extent, by the quantity of gas sent out. It was clearly seen that the serious increase in the cost of coal and oil, and the general advance in wages, would necessitate an increase of not less than 8d. per 1000 c.ft. in the price of gas; and this advance had been made to all classes of consumers throughout the district, as from the end of the June quarter. The cause of the increase appeared to have been fully understood and the necessity for it recognized by the consumers generally. Deliveries of coal and oil during the half year had been more regular; and careful attention was being given to the winter's requirements. Steps were being taken to deal with complaints as to an insufficient pressure of gas in the more remote localities; and as far back as November last, plant was ordered to deal with this. It was now in operation; and it was hoped to be able to provide a pressure adequate for all purposes throughout the whole area of supply. The question of labour was an ever-present anxiety; and the thanks of the Company were due to the officers and staff and employees generally. The women workers, in particular, were deserving of praise for the manner in which they had assisted the management; and in meeting the many difficulties they proved their adaptability.

The report and accounts having been adopted, Dr. Beddow, in moving a vote of thanks to the Chairman for presiding, to the Secretary (Mr. H. A. Stibbs, F.C.I.S.), to the Engineer (Mr. J. D. Ashworth), and to the staff generally, complimented them on the fact that the quality of the gas was even better than was required of them, it being of 520 B.Th.U., whereas only 500 B.Th.U. was necessary.

GAS STOKERS' WAGES AT STOCKPORT.

Threat to Stop Carbonization on Sundays.

Reference was made in the "Journal" of Aug. 14 [p. 290] to the trouble which had arisen with the stokers at the Stockport Corporation Gas-Works in regard to their hours of working and rates of pay. This has culminated in the men addressing the following communication to Mr. S. Meunier, the Engineer and Manager of the undertaking, from which it will be gathered that they are dissatisfied with the recent award of the Arbitrator (His Honour Judge Willis, K.C.). An accompanying note, addressed to the Chairman (Mr. Jacob Winter, J.P.) and members of the Gas Department, stated, *inter alia*, that: "All other measures taken by the men to secure a living wage for six days have failed, and they hold that their Sunday labour is a favour to the Department and must cease. They insist that neither cleric, lawyer, nor custom can compel them to work on the Sabbath; and unless their

request is granted, they will stop Sunday duty, entailing a loss to the rates."

The text of the men's letter shows the document to be a most remarkable one:

A request from the stokers to the Gas Committee for 2s. per day increase in wages, and time-and-a-half after 12 o'clock noon on Saturdays, was submitted to the Town Clerk on July 6 last. A condition asked was that such increases be paid from the date of application. This request was submitted to London on the advice of our delegates, who attended by invitation of the Ministry of Munitions.

Apparently our request has been ignored by this Shylock Committee, as no official answer has been received by the stokers. As a protest, we have decided to inform yourself and this antiquated Committee that we have decided to discontinue the Sunday morning and Sunday afternoon shifts of work after Aug. 31 unless our modest request is agreed to. At the meeting we had union, non-union, regular, and casual stokers present. Therefore the Committee can choose the lesser of two evils—a few shillings more for their workpeople, or unproductive and cooling retorts during Sundays.

The decision on our part is for the following, among other, reasons:

1.—A small bonus and its unsatisfactory application.
2.—The threats of prosecution, &c., uttered by the Chairman of the Gas Committee at the last Council meeting against a respectable and hard-working company of workmen.
3.—We find that an honorarium of £200 is freely voted to an official (members of the Gas Committee also voting for same) who receives £600 salary, or £11 11s. a week, work or play, and who has done no more than the gas stoker—*i.e.*, his duty.
4.—Misrepresentations before the Arbitrator as to the stokers' wages by the Engineer, and at the last Council meeting by the Chairman of the Gas Committee. We are prepared to disprove figures by fact in each instance.
5.—We are "fed up" with working almost every week-end, and find that a full plate of work is served out on Sunday shifts. Sunday labour usually is an accommodation to an employer, with a reduction of work as an appreciation to the worker. Not so with the Gas Department.
6.—More work, hotter and heavier work than applies in other gas-works.

Therefore, unless our request is acceded to by the Gas Committee, a stoppage of sixteen hours in gas production will take place on Sundays after this month.

WORKMEN'S COMPENSATION (WAR ADDITION) ACT.

This Act, which received the Royal Assent before the adjournment of Parliament last week, is entitled: "An Act to provide for an addition during the present war and a period of six months thereafter to the amount of the compensation payable under the Workmen's Compensation Act, 1906, in cases of total incapacity." It comes into force on Sept. 1.

Clause 1—"Temporary increase of amount of compensation in cases of total incapacity—is as follows:

(1) Where any workman is at any time during the period for which this Act continues in force entitled during total incapacity to a weekly payment by way of compensation under the Workmen's Compensation Act, 1906, he shall, whether the incapacity arose before or after the commencement of this Act, be entitled to receive from the person liable to pay the compensation, by way of addition to each such weekly payment payable in respect of any week within the said period, a sum equal to one-fourth of the amount of that payment.

(2) The additional weekly sum payable under this Act shall be deemed to be part of the weekly payment under the Workmen's Compensation Act, 1906, for the purposes of—

(*a*) The provisions relating to the recovery of weekly payments;
(*b*) Any order made with respect to payment into Court of a weekly payment;
(*c*) The provisions of paragraph (19) of the First Schedule to the Workmen's Compensation Act, 1906 (which prohibits the assignment, &c., of weekly payments);

and shall, notwithstanding that the liability to make the said weekly payment is redeemed subsequently to the commencement of this Act, continue to be payable in the same manner as if that liability had not been redeemed.

By clause 2—Provision in respect to certified schemes—"where an employer is liable to pay benefits under a scheme certified by the Registrar of Friendly Societies under section three of the Workmen's Compensation Act, 1906, the Registrar may direct that workmen who are at any time during the period for which this Act continues in force entitled to benefits under the scheme as on account of total incapacity shall receive such additional benefit as is specified by the Registrar in the direction as being in his opinion of equivalent value to the additional sum payable under the foregoing provisions of this Act."

GAS-WORKERS' DISPUTES IN AUSTRALASIA.

Reference was made in the last issue of the "JOURNAL" to a "stop-work" meeting which was to be held in Melbourne by the members of the Federated Gas-Workers' Union; and newspaper reports since received show that there has been agitation also in other places.

There was a temporary stoppage of work by a section of the employees of the Australian Gas Light Company, at Mortlake. The trouble was owing to an order issued to a number of foremen, that in future they would have to report certain breakages on the part of the employees in the retort-house. The foremen, however, who are members of the Gas Employees' Union, contended that this was tantamount to syping on their fellow unionists; and they would not obey the instruction. Consequently, they were suspended. The men employed in the retort-house then refused to turn-to unless the dismissed foremen were re-instated. Mr. Rawlins, the Secretary of the Union, heard of the trouble, and met the Engineer, so as to endeavour to arrive at a settlement, and thus remove any danger of the interruption of the Sydney gas supply. The effort was successful; and the suspended foremen returned to work; the question of breakages being referred to a conference. The dispute lasted about three hours.

In the case of Melbourne, it was subsequently decided not to hold the "stop-work" meeting of the members of the Federated Gas-Workers' Union, in connection with the delay of certain gas companies in paying the back-money increased rates awarded by Mr. Justice Higgins from November, 1915. A conference was held between the Registrar of the Commonwealth Arbitration Court (Mr. A. M. Stewart), Mr. P. C. Holmes Hunt, representing the Gas Companies concerned, and Mr. C. Crofts, of the Gas Employees' Union. After discussion, it was asked by the Registrar that the employees should hold a meeting, at which a suggestion should be submitted that the notice to hold the "stop-work" meeting should be withdrawn, and that the representatives of the parties should meet the Registrar again. Mr. Croft acceded to the Registrar's request; and the Executive of the Union considered the matter. At the conclusion of the meeting, it was announced that it had been decided to abandon the "stop-work" meeting. At a later conference convened by the Registrar, a definite understanding was arrived at on the chief matters in dispute. The Gas Companies undertook to pay the retrospective rates awarded by the 15th of June, with the exception of the Adelaide Gas Company, who agreed to pay them on June 29. The questions that the Companies claim were not in dispute prior to December last it was arranged should be referred to Mr. Justice Higgins at the earliest date possible.

A wages dispute of a similar character at Hobart, Tasmania, resulted in 55 men coming out on strike; and although the office staff worked well to maintain a supply of gas, both heating and lighting consumers had temporarily to resort to other means of meeting their requirements. However, the inconvenience did not last long; a satisfactory settlement of the trouble being reached at a conference between the Directors of the Company and representatives of the employees.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Aug.* 27.

In the London tar products market, there is no particular change to record. There are a considerable number of inquiries for pitch, and the position is very firm. The export price is not below 45s. per ton net in bulk at makers' works. Makers are not anxious sellers. A certain number of shipments continue to be made. In ordinary London creosote, the position remains unaltered; all transactions being regulated by the Government. Solvent naphtha continues steady at 2s. 2d. to 2s. 3d. per gallon naked. Anthracene, 48-50 p.ct., is 6d. per unit, casks free, both at makers' works.

There is an increasing demand for sulphate of ammonia for forward delivery for home agricultural purposes at the Government prices.

Tar Products in the Provinces.

Aug. 27.

There is no alteration in the markets for tar products. Business has again been done in pitch in London in the neighbourhood of 50s. to 52s. 6d. per ton. Solvent naphtha is still very firm, and the demand for prompt and forward delivery is consistent.

The average values for gas-works products during the week were: Gas-works coal tar, 23s. to 27s. Pitch, East Coast, 17s. to 18s. per ton; West Coast—Manchester 17s. 6d. to 18s. 6d., Liverpool 17s. 6d. to 18s. 6d., Clyde 18s. to 19s. nominal. Benzol, 90 p.ct. North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6¼d. to 6¾d. Solvent naphtha, naked, North, 1s. 11d. to 2s. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, 3¼d. to 3¾d. Heavy oils, in bulk, North, 3⅜d. to 4¼d. Carbolic acid, 60 p.ct., East and West Coasts, 3s. 4d. naked. Naphthalene salts, 80s., bags included. Anthracene, "A" quality, 3d. per unit; "B" quality, 1¾d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

Trade in tar products generally is quiet; but the improvement in the position of pitch continues, and holders are no longer ready to let it go at absurdly low prices. A very good number of inquiries are being received from the Continent, and the London price remains firm at about 45s. net per ton *ex* makers' works for export. Shipments are being continued throughout the summer. Provincial values maintain a hardening tendency, and probably some concerted action on the part of producers would enable them to obtain some of the export trade at a further advance in provincial prices. The contracting period for next season's requirements is practically at hand, and for local pitch f.o.b. at North-East ports 25s. per ton is indicated for the new season beginning in October, which compares with about 17s. 6d. for the past season—a very marked advance. Probably, however, business could be effected at slightly less than this quotation. Creosote is still in the same position—nothing can be done without licences, and these are few and far between. The output is required for national purposes; but it is not yet known at what prices the Government will take over supplies. Meanwhile, as a substitute for creosote in the preservation of timber, a process has been patented to make available the naphthalene containing ingredients remaining from the alkaline treatment of light and heavy creosote oils in the production of liquid fuel for internal combustion engines. The idea is not new, of course; but the latest process lays claim to simplicity and low cost. Little interest is shown in cresylic acid, in spite of the season and the absence of many other disinfectant materials; the market being rather flat at 2s. 4d. to 2s. 7d. Naphthalenes show no change. Export licences are still available for refined sorts. The supply of both crude and refined is small, and a scarcity is looked for. There is a scarcity also of solvent naphtha, which has

developed quite a strong one, and higher quotations are expected. It is a matter of some surprise that prices have been so moderate for so long. Heavy naphtha has also improved; prices ranging from 1s. 6d. to 1s. 9d. per gallon in casks, according to quality. The position of benzol remains unchanged. The 90's show no advance upon the price of July, 1914; whereas toluol is over 100 p.ct. higher. Trade benzol is undoubtedly worth 2s. a gallon at the works. Aniline oil is quiet and dull. Quotations are about as follows:

Aniline Oil (pure): 1s. 3d. per gallon.

Benzol: 90 % London 1s. 0¾d., North 10¾d. to 11¾d.; 50 % North 1s. 3d. to 1s. 4d. naked per gallon.

Carbolic Acid: 60 % East and West Coast 3s. 4d. per gallon; crystals 40 %, 1s. 3d. per lb.

Crude Tar: London 26s., Midlands 23s. 6d., North 24s. per ton, *ex* works.

Pitch: London 47s. 6d. f.o.b.; East Coast 18s. to 20s. f.o.b.; West Coast—Liverpool and Manchester 17s. 6d. to 18s. 6d. f.a.s., Clyde 20s. per ton. New Season: Provinces 25s.

Solvent Naphtha: Naked London 90-190 % 1s. 6d. to 1s. 8d.; North 1s. 4d. to 1s. 6d. per gallon; 90-160 % naked London 2s. 3d. to 2s. 4d.; North 1s. 11d. to 2s. 2d. per gallon.

Crude Naphtha: Naked 30 % 8¼d. to 8½d.; North 6¼d. to 6½d. per lb.

Naphthalene: Refined £25 to £30; salts 80s., bags included.

Toluol: Naked, London 2s. 3d.; North 2s. 3d.

Creosote: Nominal, London 4¼d.; North 3¾d.; heavy oil 4¼d. per lb. in bulk.

Anthracene: "A" quality, 40-45 %, 3d. per unit; "B" quality, 1¾d. to 2¼d.

Cresylic Acid: 95 %, 2s. 5d.; 97-99 %, 2s. 6d.-2s. 7d., *ex* works London and f.o.b. other ports.

Grease Oils 18° Tw. (naked), £6 per ton f.o.r. makers' works.

Sulphate of Ammonia.

The position here is practically without change; the bulk of production going into home consumption. As a very great privilege, a few licences have been issued for export to British possessions. The state of the export market, however, may be gauged by the monthly trade returns, which indicate that only 2874 tons of sulphate were exported during July, compared with 20,565 tons in July, 1916; while the total for the seven months of the current year is under 40,000 tons, contrasted with 148,445 tons and 185,595 tons for the similar periods in 1916 and 1915 respectively. The average f.o.b. value for the July shipments was £20 7s. per ton, bags included; whereas the latest quotations for export, arranged by the Sulphate of Ammonia Association in London, are nearer £24 per ton. The home demand is fairly heavy, both for immediate use and forward delivery, at the prices officially fixed. The Corn Production Bill has received the Royal Assent, and sulphate makers feel they have a real grievance in that their interests have not been protected in the Bill by the fixation of values. This, and the regulations relating to payment and delivery, are still tending to retard business. Manufacturers are hoping to obtain fairer terms from the Government; but in many quarters it is believed to be a vain hope. In South Wales, a scarcity of nitrate of soda and the likelihood of very short supplies for some time has led to a heavy demand for sulphate, which is an absolutely efficient substitute. Coke-ovens are working well, and outputs should easily be increased. In America, prices continue high, although production is increasing rapidly. The product for 1917 is likely to greatly exceed that for last year. Makers there are attending to previously-made contracts with old customers, and supplies available from these sources are only occasional and quite limited.

Quotations (basis 25 p.ct., double bags): Home trade: September, £15 7s. 6d.; October-December, £15 15s. January-May, £16 7s. 6d. —all delivered; 10s. less at makers' works.

Export (under licence only): London, Liverpool, Leith, Hull, £23 10s. to £24 f.o.b.

COAL TRADE REPORT.

Northern Coal Trade.

The coal trade shows on the whole a slightly better tone; the demand being fuller both for home and export, though it has not had much effect on the prices. In the steam coal trade, there are more inquiries from neutral countries. Best Northumbrian steams are steady at 30s. per ton f.o.b.; second-class qualities are from 25s. 6d. to 27s., according to kind; and steam smalls are still plentiful at from 18s. 6d. to 20s. 6d. Very high freights are quoted where tonnage can be got. In the gas coal trade, there is now a steady growth in the consumption; and this, and the heavy demand for coking coal, makes Durham fuel generally firm. Best gas coals are 25s. per ton f.o.b.; second-class descriptions are quiet at about 23s. 6d.; and for "Wear specials" the inquiry is good—from 27s. to 29s. being the current price. The rate of freight on gas coal is shown by 15s. to 15s. 6d., from the Tyne ports to London. Production of coal is fairly good, and is well taken up, as the deliveries on the long contracts continue full. The rate of wages at the mines seems stationary, and does not follow freely the variations in the selling prices of the product. In the coke trade, business is brisk and prices are maintained, despite enlarging output. Good gas coke is from 29s. to 31s. per ton f.o.b., with a freight of 45s. for Dunkirk and other ports in the north of France.

Wolverhampton Gas Company.—The accounts of the Company for the past half year show a net profit of £14,101. This, added to the balance brought forward, enables the Directors to recommend payment of dividends of 3 p.ct. upon the preference stock, 5 p.ct. upon the consolidated stock, and 3 p.ct. upon the new ordinary stock, less income-tax. They further recommend that £559, interest for the half year, be placed to the credit of the reserve fund, and £71 like interest to the credit of the insurance fund, and that the balance of £45,338 be carried forward.

Fatality at the Beckton Gas-Works.

Mr. G. E. Hillary, Coroner of the Borough of West Ham, last Friday held an inquiry into the death of Charles Phillips, a labourer 61 years of age, employed by the Gas Light & Coke Company, who was killed on the 21st inst. while unloading coal-trucks into barges at one of the piers at the Beckton works. It appeared that the trucks were continuously being shunted by means of a capstan; and deceased was pinned between the buffers of two of the trucks. In answer to Mr. Beesly Robinson (who appeared for the Company), a fellow workman of the deceased, named Monk, said he had understood since he was quite a lad that it was a rule of the Company that workmen were not to pass under or between moving vehicles, and that if they did so it was at their own risk. At the time deceased was crossing, the buffers were fifteen inches apart; and he knew that continuous shunting was going on. Trucks could not be moved until they were unscotched. If deceased had gone round the end of one of the trucks, he would have been safe. Replying to the Government Inspector, Monk said that, as the trucks were being continuously shunted, it was dangerous to go through such a narrow space. Deceased was removed to the Seamen's Hospital, where it was found that fractured ribs on the right side had penetrated the lung, and caused death by hemorrhage. The Coroner remarked that deceased apparently knew the risk he was running, and, as many people did, elected to incur the danger of the short cut, though there was plenty of room to go round. The verdict was in accordance with the evidence.

Waterford Gas Company.—The City of Waterford Gas Company announce a dividend of 5 p.ct., and carry-forward of £7952. A year ago the dividend was 6½ p.ct., and the carry-forward £6802.

Bridport Gas Company, Ltd.—At the annual meeting of the Company, the Directors reported that, in common with other undertakings, owing to the present high price of coal and labour, it was found necessary to make a further increase of 4d. per 1000 c.ft. in the price of gas as from the 1st ult. Dividends, less tax, were declared of 5½ p.ct. on the ordinary shares and 5 p.ct. on the preference shares.

Hathersage Gas Company.—The report of the Directors of the Hathersage and District Gas Company for the past year shows, after providing for depreciation, a profit of £1481, while £329 was brought forward. Deducting the interim dividend, there was £1209 for disposal. The Directors recommend a dividend for the half year of 9d. per share, making 6½ p.ct. for the year (less tax), the placing of £100 to reserve, and the carrying forward of £518.

Salisbury Gas Light & Coke Company.—Mr. George Fullford, J.P. (the Chairman), presided at the annual meeting of the Company, and, in moving the adoption of the report and the payment of the full statutory dividends, said they had passed through a very anxious and difficult year. Coal, oil, and all commodities had been exceptionally dear, and oil difficult to obtain. Trade, on the other hand, had been very good; and he was happy to say they could still sell gas at the old figure. The past six months showed an increased output of gas of 14 p.ct., thanks to their capable and energetic Engineer and Manager (Mr. W. Fielden). Like all other businesses, they were working with a sadly depleted staff, and any further reduction in their manufacturing department would imperil the supply, and prevent them fulfilling their statutory obligations.

Barrow Gas Workers and the Tribunal.—At the Barrow Military Appeal Tribunal last Wednesday, the Special Military Representative appealed against several exemptions which had previously been agreed upon by the Local Military Representative and the Local Advisory Committee; and among the number were those of three men employed as labourers at the Barrow Corporation Gas-Works. Mr. F. Chadderton (the Gas Manager) appeared to support the exemptions, and pointed out the difficulties of getting other men. In addition, the Local Advisory Committee wrote: "We consider that the Corporation departments should not be further depleted of men, having already lost so many. Substitute labourers for the gas-works or for the health departments are practically impossible to obtain. We also have in mind the importance of the production of gas from a national point of view, as regards the manufacture of explosives—not to speak of the domestic needs of the town and those of Messrs. Vickers." The Tribunal confirmed the exemptions; the Mayor pointing out, however, that they wished to impress upon Mr. Chadderton the importance of trying to get other men not of military age to do the work.

A Hastings Gas-Worker's Certificate Withdrawn.—At a recent meeting of the Hastings Military Exemptions Tribunal Mr. Charles F. Botley, the Engineer of the Hastings and St. Leonards Gas Company, applied for exemption in the case of William A. Hodd, aged 24, a fitter and driver of machinery in the employ of the Company. In reply to the Military Representative, Mr. Botley said the man had done his present work for nearly three years—having been previously trained for it. There were only two men engaged on this work, which was carried on night and day. If this man was taken, something serious might happen. They could only now drag on with the work in the best way they could. The man was just under 25 years of age, which would make him exempt. His certificate had been withdrawn with the view of finding a substitute; but it was not possible for this to be done. As to the man being A1, it was essential that a man engaged day and night all the year round must be of good health. Mr. Botley submitted that it was in the national interest that the man should be left, as he was essential to the work, as they were already "on the rocks." Unless they had the men to carry on, the Company could not fulfil their obligations. If a substitute could be found, he would be prepared to let the man go at once. It ought to be made clear to the public that it was through no fault of the Company that the present condition of things was so bad. They were trying to do their duty; but they could not do so if they were to be penalized by their men being taken. The gas industry was of more importance than ever to-day for the prosecution of the war. It was of vital consequence. Three months' exemption was granted; the Tribunal expressing the hope that a substitute might be found. If one was forthcoming before that time, Mr. Botley said he would be prepared to let the man go.

Navan Gas Contract.—At a meeting of the Navan (co. Meath) Urban District Council, the Gas Company intimated that they could not make any reduction in the price quoted for gas for public lighting—viz., 7s. 6d. per 1000 c.ft. It was decided that the tender should be accepted.

Increased Consumption at Harrow.—It is stated in the report of the Directors of the Harrow and Stanmore Gas Company, for the half year ended June 30, which will be submitted at the meeting next Monday, that the sale of gas was 16·06 p.ct. more than in the corresponding period of the previous year. This increase the Company were able satisfactorily to meet.

Trouble at the Birkenhead Gas-Works.—Early in the morning on Monday of last week, all the men engaged on the Birkenhead Corporation Gas-Works came out on strike; but after discussion with the officials, they returned to work at breakfast time, pending a meeting of the Gas Committee the same afternoon to discuss their further claim for a 3s. increase in wages. Later, representatives of the workers met the Gas Committee and the Wages Committee, and made certain proposals. It was arranged that a joint deputation should ask the Chief Industrial Commissioner to receive them.

Wages of Birmingham Gas-Fitters.—The Committee on Production have made an award in respect of the application for an advance of wages made by the Gas-Fitters' Trade Association on behalf of their members employed by the Birmingham Corporation Gas Department and firms belonging to the Birmingham and District Master Gas-Fitters' Association. Since the outbreak of war, the men concerned have received an advance of 1½d. per hour, and an advance of 3s. per week conditional upon a certain number of hours being worked. The Committee state their finding is that, as from the beginning of the first full pay day following the date of their award, the men concerned shall receive an advance of 1d. per hour—such increase to be regarded as war wages, and recognized as due to, and dependent on, the existence of the abnormal conditions now prevailing in consequence of the war.

Defective Lighting of Provincial Towns.—The Launceston Town Council discussed last week the question of public lighting, and decided that the Lighting Committee should arrange to have lighted during the winter as many lamps as the police would permit. Mr. M'Donald said that in London there was no stint of light, and he had been able to read a newspaper under a lamp in the very heart of the city—a thing they could not do in Launceston. In his opinion, the police were making a mistake in so severely restricting the lighting; and if the place could not get more light, the Council ought to consult some higher authority than the police. It was dangerous to have so few lights in their narrow streets. The Town Clerk pointed out that a certain amount of legal responsibility rested on the Council in the matter. The High Court had held that local authorities must see that dangerous places were properly lighted, and actions had been brought against local bodies for not lighting them properly.

Padiham and Blue Water Gas.—In a report to his Committee, Mr. A. T. Harrison, the Gas Engineer to the Padiham District Council, remarks that experiments had been made with the production of blue water gas in the vertical retorts, and these had been very satisfactory; an increased production of over 20 p.ct. of gas per ton of coal being obtained, with practically no reduction in the calorific value. The experiments were made with a view to the saving of coal.

Burton Gas-Workers' Notices.—The Burton gas workers, to the number of over 80, have given in their notices to the Corporation. The notices will take effect on Sept. 7 next. This action is the outcome of the dispute between the gas workers and the Corporation on the question of the recent increase of wages, which were not made retrospective, and as the result of the failure of the efforts to persuade the Local Authority to submit the matter to arbitration. The gas workers, who are controlled by the regulations of the Ministry of Munitions, are compelled to give three weeks' notice; while the general labourers of the Corporation, who are also concerned in the dispute, have to give only a week's notice. It is expected, however, that efforts will be made to prevent a strike.

Weymouth Consumers' Gas Company.—The stockholders were congratulated upon the continued vitality of the undertaking by the Chairman (Mr. J. G. Rowe) at the half-yearly meeting of the Company last Thursday. In the period under review, he said, the demand for gas had been—though only slightly—again on the up-grade. Compared with the half year immediately before the outbreak of war, the sale of gas in the past six months showed an increase of over 4 million c.ft. As to the financial results of the past half year, there was an increase of £83 in the gas-rental; and the returns from residual products were up by £546. There was a profit of £2476, which was about £100 more than was required to meet interest and dividend charges. Coal was costing over 9s. per ton more now than it did just before the war. The report was adopted; and a dividend for the half year on the ordinary stock at the maximum rate of 5 p.ct. per annum, less income-tax, was declared.

Gas Panic in Berlin.—Under this heading, "The Times" last Thursday published the following: There is great excitement in Berlin over the announcement of drastic restrictions of the consumption of gas. All over Germany the consumption of gas is to be reduced by 10 p.ct. of the monthly consumption a year ago; but in Berlin new orders have been issued which are calculated to mean a reduction by one-half of the gas consumption of every ordinary household. It is long since any official order has been so bitterly attacked. The newspapers are full of violent articles and letters, which say that the situation next winter will be intolerable. The excitement has been increased by preliminary announcements of drastic measures to reduce the amount of coal used in "central heating" of all buildings. It is proposed that only a certain number of rooms in every house shall be heated; that there shall be no heating until a certain low temperature has been reached; and that many public buildings shall not be heated at all.

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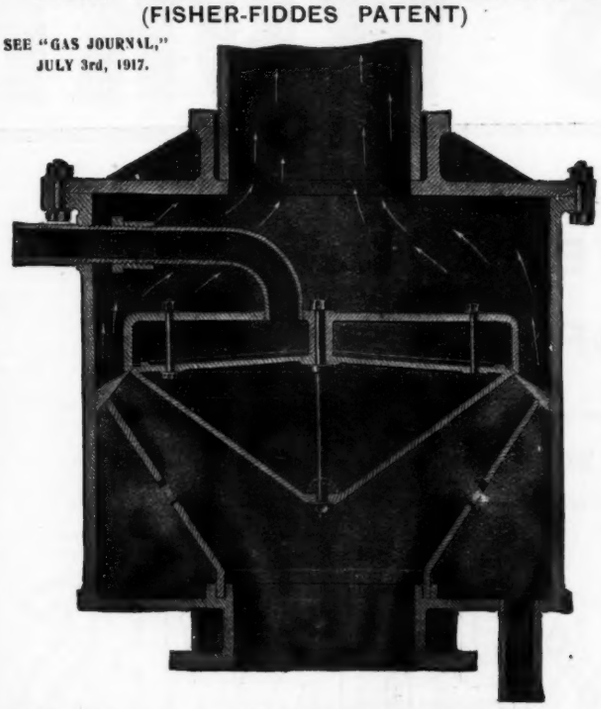

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Wanganui (N.Z.) Municipal Gas-Works.

That the municipalization of the Wanganui Gas-Works has proved highly beneficial to the ratepayers and the public is, says Mr. G. Murch (the Town Clerk), in his report for the year ended last March, amply demonstrated by a study of the following figures. Not only has the undertaking supplied gas at a price lower than that ruling in some of the large centres in the Dominion, but it has contributed over £30,000 for the relief of rates, besides providing interest on the capital employed and substantial sums for the repayment of such capital. Transferred to general account for the relief of rates, £31,900; interest on capital employed, £37,075; transferred to sinking funds, £16,282; transferred to plant account, £22,795. The total amount borrowed and expended on the works was £100,000; but by the application of the accrued sinking funds on a portion of the loans, this was, in November, 1914, reduced to £88,590. The accrued sinking fund for repayment of loans at maturity stands at £9234. The revenue account for the period under review shows that the usual steady progress has been maintained; but the increased cost of coal and labour, together with a larger expenditure on repairs and maintenance, new plant, gas-fittings, &c., more than accounts for the additional revenue as compared with the previous year, reducing the credit balance from £1038 to £100. Out of the year's profits, a sum of £4000 has been transferred for the relief of the rates.

Wellingborough Gas Light Company, Ltd.—A very satisfactory statement of accounts for the half year ended June 30 was presented at the meeting of the Company yesterday. The Directors reported that the quantity of gas sold during this period was nearly 12 p.ct. more than for the corresponding half of 1916. The crude benzol plant, erected at the request of the Ministry of Munitions, has been completed, and is working to the satisfaction of the Ministry. Since the beginning of the war, 27 of the Company's employees have joined His Majesty's forces; and unhappily one-third of this number have been killed or are missing. Dividends for the six months were recommended, less income-tax, of 6⅜ p.ct. on the original shares, and 5⅓ p.ct. on the additional shares.

Kettering Gas Company.—At the half-yearly meeting of the Company on the 14th inst., the Directors reported that the works were being maintained as far as possible in an efficient state; and the general working of the Company was being carried on to their satisfaction. They regretted that, owing to the continued increase in working costs, they had been reluctantly compelled to advance the price of gas by 3d. per 1000 c.ft., as from the commencement of the current quarter. Mr. J. T. Stockburn, J.P., in moving the adoption of the report, pointed out they had only increased the price of gas by 3d., whereas some companies had done so by as much as 8d. or 9d. The payment of dividends at the rates of 11½ p.ct. per annum on the "A" stock, 8¼ p.ct. on the "B" stock, and 5⅝ p.ct. on the "C" stock were agreed to.

Australian Gas Light Company's Large Holder.

Newspapers lately to hand from that part of the world contain accounts of the turning of gas into the big holder that has been erected at the Mortlake Station of the Australian Gas Light Company. After an inspection of the works by the Directors and officials of the Company, the Engineer (Mr. Andrew Wilson) reported that the holder had been completed, and asked the Chairman (Mr. G. J. Cohen) to put it into commission by turning gas into it. This ceremony was followed by luncheon, during which the Chairman said that, owing to the rapid growth of the Company's business, it was considered in 1912 that more storage accommodation should be provided at the works, to secure a certainty of supply. Designs for a holder on modern lines were prepared, and tenders for the supply of the necessary materials and for the construction of the tank were called for early in 1913. The successful tenderers for the supply of the materials were Messrs. C. & W. Walker, Ltd., of Donnington, and for the construction of the tank Messrs. W. Solomon and Sons, of Sydney. The first sod was turned in May, 1913; so that the holder had taken exactly four years to construct. So expeditiously did the contractors for the tank proceed with their work that they created a world's record in rock excavation. The contractors for the supply of the materials also proceeded with their part of the work in a like manner; the bulk of the materials being shipped before war broke out, and the whole before the submarine menace threatened shipping to any great extent. They also carried out their contract so conscientiously that no difficulty of any kind was experienced in the erection, which was carried out by the Company with the assistance of three of the contractors' staff. The holder was the second largest in the world, having a total capacity of 12¾ million c.ft. and a working capacity of 12 million c.ft. The total cost of the holder had been £188,000. It could safely be said that the whole structure ranked among the finest examples of modern gas engineering, and reflected great credit on all concerned in its erection.

Stirling Coal Area.—Exception is taken by the Stirling Gas Company and the Burgh Electrical Engineer to the fact that, under the Transport of Coal Order, Stirling is placed in Area No. 19, which includes Fife, Clackmannan, and the districts north of the Forth, but excludes Millhall, Fallin, Bannockburn, lying quite close to the town, and the other Stirlingshire coalfields in Area No. 18. They contend that Stirling should be included in Area No. 18. The Coal Controller was asked by the Town Clerk if it would be allowable under the Order to cart coal by road from the collieries in the neighbourhood of Stirling into the burgh; and he replied that, as the Order does not provide for coal conveyed otherwise than by public railway from the colliery, the carting from one district into another is allowed. The Secretary of the District Coal and Coke Supplies Committee for Scotland has also written to the Town Clerk explaining that he has recommended the Controller to put Stirling within Area No. 18, in view of the fact that it is situated south of the River Forth, which should have been the dividing-line between Areas Nos. 18 and 19.

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MANCHESTER. NOTTINGHAM.

Dover Gas Company.—Next Monday the half-yearly meeting of the Company will be held. The Directors' report states that, in view of the "exorbitant cost of transport" to and from the works, they decided to construct a railway siding. It is hoped that this work, which is now in hand, will soon be completed; and the Board confidently anticipate that its use will result in a considerable reduction in the cost of all railborne traffic. The net profits of the half year to June amounted to £1837. The Directors recommend a dividend at the rate of 7½ p.ct. per annum, less income-tax, which will reduce the undivided profits by £975.

Kingston (Surrey) Gas Company.—At the half-yearly meeting of this Company on the 15th inst., under the chairmanship of Mr. C. E. Nuthall, J.P., the report presented by the Directors showed that there had been an increase in the sales of gas to private consumers of more than 25 million c.ft. over the corresponding period of 1916. It was resolved that a dividend at the rate of 5 p.ct. per annum for the six months to June be paid on the consolidated ordinary stock of the Company. The meeting concluded with a cordial vote of confidence and of thanks to the Chairman and Directors, the Manager (Mr. H. W. Packham), Secretary (Mr. C. S. Sherrard), and staff generally, for the satisfactory manner in which the affairs of the Company had been managed and the work done during the past half year.

Good Service Rewarded at Bangor.—In the course of some brief notes on p. 332 of last week's "JOURNAL" regarding the Bangor (co. Down) Urban District Council gas undertaking, the good work done by Mr. Barker Mitchell, the Manager, during the sixteen years he has held his appointment, was commented upon. It is a pleasure to learn that appreciation of Mr. Mitchell's good services has been marked in a tangible manner by his Council, who have increased his salary £50 per annum.

Woking District Gas Company.—The receipts of the Company from sales of gas in the six months ended June 30 show an increase of 10·23 p.ct. over the corresponding period of 1916, and those from residual products an increase of 8·39 p.ct. The revenue for the half year has been £12,137, and the expenses on revenue account £9786, leaving a net profit of £2351 to be carried to profit and loss account, to which must be added the balance brought forward of £1961. After making the usual charges for interest, &c., and writing off £300 part cost of the Special Act, there remains an available balance at the credit of the profit and loss account of £3554. The Directors will recommend at next Monday's meeting the payment of dividends on the preference stock at the rate of 5 p.ct. per annum, and on the "A" and "B" ordinary stocks at the rate of 5½ p.ct. per annum, which will absorb £1739, leaving £1815 to be carried forward.

STOCK MARKET REPORT.

THE prevailing tone of things in general on the Stock Exchange was quite cheerful, although, of course, there was no increase in activity to be expected. Even as it was, the leading departments scarcely had their fair share of the business; the bulk of it being claimed by the various undertakings which collectively make up the Miscellaneous group. Despatches from the fronts were again the chief factor in imparting strength to the markets. The withdrawal of the railway engineers and firemen's strike notice also afforded relief.

The gilt-edged market was rather upset by more Australian loan issues, and War Loans, which had been rising freely, came in for some realization of profits. In regard to the prospect of a new loan, the chances of a premium bond issue were much discussed with increasing expectation that its sentimental opponents will be overborne. Colonial issues were quite dull. Home Rails were unsettled—depressed at first by the eight hours' demand, then relieved by its retraction, and then again depressed by a substituted demand for a largely increased wage. Americans were easy; but Argentines were steady.

In the Foreign Market, French and Russian made advances, checked towards the close by some profit snatching. Mexican, Chinese, and Japanese were similarly treated. The South African Market was firm. The Miscellaneous group were bright and active. Conspicuous among these were Nitrates and Food concerns. Rubber and Oil were strong and in brisk demand, and Breweries had some firm lines.

Business in the Gas Market made up a tolerably good aggregate for the time of year, helped by transactions in some of the issues which are not frequently in evidence. The tone, too, was decidedly firm, and all changes of quotation were in the upward direction. Primitivas were most noticeable in this respect, and were actively dealt in. Other gas undertakings that made advances were Gas Light and Coke, Cape Town, Chester, and Liverpool.

Bargains done for cash during the week were as follows: On Monday, Alliance and Dublin 52½, Brentford "A" 79¾, 80, ditto "B" 77¾, 78, Brighton and Hove "A" 104, Commercial 4 p.ct. 72, Gas Light ordinary 68, 68⅝, 68¾, 69, ditto preference 72, Imperial Continental 79½, 80, Primitiva 36s., 36s. 6d., ditto preference 57s. 6d., 60s., South Metropolitan debenture 55¾, 56, South Suburban preference 75½, 76. On Tuesday, Brentford "A" 79¾, 80, British 33¼, 33½, Commercial 4 p.ct. 72½, Gas Light ordinary 68½, 69, 69¼, ditto preference 71, Imperial Continental 79½, 80, 80¼, ditto debenture 63, Monte Video 8½, Primitiva 37s., 37s. 6d., South Metropolitan debenture 55¾, 56. On Wednesday, Brentford "B" 77¾, 78, Gas Light ordinary 69½, 69¾, ditto preference 72, Imperial Continental 79½, 79¾, ditto debenture 63½, Primitiva 37s., 37s. 6d., 37s. 9d., 38s., ditto preference 60s., Wimbledon 89½, 90. On Thursday, Bombay 5¼, Cape Town 3, Gas Light ordinary 70, Imperial Continental 79½, 80, Primitiva 40s., 42s. 6d., ditto preference 59s. 4½d., 62s. 6d., 63s. 9d., South Suburban 74¼. On Friday, Brighton and Hove original 150, Gas Light ordinary 69, 70, ditto debenture 56, 56¼, 56½, Imperial Continental 80½, Primitiva 40s. 42s. 6d., 43s. 9d., 45s., ditto preference 62s. 6d., 63s. 9d., 65s., 66s. 3d., South Metropolitan debenture 55¾, 56, 56¼.

The Bank rate is 5 p.ct., as fixed on April 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Previous Dividend and Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
175,472	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	57—62	..
1,551,868	,,	April 8	2½	5⅛%	Alliance & Dublin Ord.	59—64	60—65	62½
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	57—62	..
280,000	5	April 29	7½	4/6	Bombay, Ltd.	5¼—6¾	4¾—5¾	5½
50,000	10	Feb. 26	16	15/-	Bournemouth Gas and Water { 10 p.c.	23—30	24—26	..
888,110	10	,,	7	7/-	B 7 p.c.	15—15½	10¾—11¼	..
115,000	10	,,	6	6/-	Pref. 6 p.c.	13¼—14	9¾—10	..
159,740	—	—	—	4%	4 p.c. Deb.	..	60—71	..
992,045	Stk.	Feb. 26	14	5⅛%	Brentford A Consolid.	261—266	79—84	79¾—80
734,920	,,	,,	11	4⅛%	Do. B New	204—209	77—80	77¾—78
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	81—86	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—93	65—67	..
217,380	,,	Feb. 26	11	10%	Brighton & Hove Orig.	208—213	150—155	150
244,200	,,	,,	8	7%	Do. A Ord. Stk.	154—159	102—107	104
530,000	20	Mar. 26	12½	22/6	British	44—45	33—34	33¼—33½
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	66—68	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	53—56	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1¼—2¼	2¾—3¼	3
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	6¼—7¼	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	78—79*	..
1,513,280	,,	Feb. 12	5/9/4	49/4	Commercial 4 p.c. Stk.	106—108	72—74	72—72½
560,000	,,	,,	5½	46/8	Do. 5½ p.c. do.	103—105	66—68	..
475,000	,,	June 11	3	3%	Do. 3 p.c. Deb. Stk.	69¾—71½	51—53	..
800,000	,,	,,	4	—	Continental Union Ltd.	76—79	39—41	..
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	61—63	..
278,400	—	—	—	11¼%	Croydon B and C 7 p.c.,	..	170—180	..
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	5⅛%	Derby Con. Stk.	128—135	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,009,180	10	July 29	10	5/0	European, Ltd.	17¼—18	11—12	..
16,313,430	Stk.	Feb. 10	4/17/4	37/4	Gas Light and Coke { 4 p.c. Ord.	98—102	68—70	68—70
2,600,000	,,	,,	8¾	3⅛%	3¾ p.c. max.	76—79	54—56	..
4,062,335	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	70—72	71—72
4,674,850	,,	June 11	3	3%	3 p.c. Con. Deb.	72½—74½	55—57	56—56½
130,000	,,	,,	10	10%	10 p.c. Bonds	..	..	..
358,740	,,	Mar. 12	5	4½%	Hastings & St. L. 3½ p.c.	87—89	60—65	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16¾	7½—8½	..
86,600	—	—	—	9½%	Hornsey 7 p.c.	..	120—130	..
131,000	Stk.	Mar. 12	7½	7⅛%	Ilford A and C.	151—154	95—100	..
65,780	,,	,,	6⅜	5⅞%	Do. B	115—118	75—80	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb.	92—94	65—68	..
4,940,000	,,	May 14	9	4½%	Imperial Continental	150—160	79—84	79½—80½
1,295,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	62—65	63—63½
235,242	,,	Mar. 12	6½	6⅜%	Lea Bridge Ord. 5 p.c.	119—121	85—90	..
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A	211—213	82½—83½	..
						146—148		
306,088	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	70—72	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4½—4¾	3¾—4	..
250,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	88—98	..
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11¼—12	8—8½	8½
1,875,892	Stk.	July 29	4½	4½%	Newcastle&Gatsh'dCon.	98½—99½	70—71	..
529,705	,,	June 26	3¾	3⅜%	Do. { 3½ p.c. Deb.	82—83	61—63	..
55,940	10	Feb. 26	7/14/0	7/0	North Middlesex 7 p.c.	14—15	10—11	..
300,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	104—106	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7¼—7¾	2—3	..
60,000	50	Feb. 26	13	13%	Portsea, Island B	128—131	92—97	..
100,000	50	,,	12	11%	Do. C	118—121	85—90	..
52,000	50	,,	10	9%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5½—6	2½—3⅜	36/—45/-
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4¾—5	3¼—3⅝	57/6—65/3
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	78—80	..
—	—	—	—	4%	Do. ,, 1911	..	..	..
346,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	59—64	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7¾—8¾	..
125,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—42	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	223—234		
209,984	,,	,,	10	10%	Do. B	222—224	180—184	..
523,500	,,	,,	10	10%	Do. C	220—222		
90,000	10	May 28	9	6/-	South African	10½—11½	8¾—9½	..
6,609,895	Stk.	Feb. 10	5/4/0	46/8	South Met. 4 p.c. Ord.	111—113	73—75	..
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	72½—74½	55—57	55½—56½
224,820	,,	Feb. 26	8¼	7⅜%	South Shields Con. Stk.	157—159	140—142	..
952,795	,,	,,	6	4⅜%	S'th Suburb'n Ord. 5 p.c.	114—116	74—76	74½
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	75—77	75¼—76
135,000	—	—	—	4½%	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	86—88	..
647,740	,,	May 14	5	5%	Southampton Ord.	99—102	76—78	..
120,000	,,	Feb. 12	7½	5%	Tottenham { A 5 p.c.	135—138	95—100	..
782,275	,,	,,	6	3⅛%	District { B 3½ p.c.	115—117	68—73	..
181,255	,,	June 26	4	4%	4 p.c. Deb.	87—89	63—65	..
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	60—65	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109½	89—91	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Feb. 26	8⅜	80/-	Wandsworth A 5 p.c.	151—156	114—119	..
255,636	,,	,,	6¾	65/-	Do. B 3½ p.c.	129—134	99—101	..
108,075	,,	,,	5/17/8	56/-	Do. C 3½ p.c.	110—115	86—91	..
352,000	,,	,,	6¼	58/9	Wimbledon 5 p.c.	117—122	88—93	89½—90
98,000	,,	,,	6⅜	65/-	Epsom 5 p.c.	121—126	96—101	..
88 416	..	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—53	..

* Ex ½ Div.

Manchester Gas-Workers' Arbitration.—The award has been issued of the Committee on Production who sat in London recently in connection with arbitration proceedings relative to the advisability or otherwise of establishing a uniform working week in the Manchester Gas Department. An application was made by the National Union of General Workers on behalf of their members for a uniform working week in lieu of the present arrangement, whereby different sections of men work 52, 53, 54½, and 61½ hours respectively. No settlement had been arrived at between the parties; and the matter was referred to the Committee on Production for decision. The Committee have given careful consideration to the statements; and their finding is that the claim by the Union has not been established.

Increased Wages Demand by Miners.—The Coal Controller has arranged to meet to-day the Executive of the Miners' Federation of Great Britain, to consider the application agreed to by the Glasgow conference in July for a 25 p.ct. increase in the wages of all the men and boys employed in and about the coal mines of Great Britain. The application is based upon the increase in the cost of living, and not upon the economic position of the trade or the selling price of coal. The present wages in the different mining districts range from 7s. 6d. to 11s. 6d. per day, according to the class of work, with generally much higher average earnings by coal-hewers who work on contract at tonnage rate. It is said that, on a conservative estimate, the concession of the full demand would represent an addition to the wages bill of British collieries of £500,000 a week.

Mr. A. J. Ashton, K.C., sat at the Municipal Offices, Brighouse, last week, as Arbitrator in the matter of the wages of Corporation employees in all departments; the number of men affected being 150. The men had demanded an increase of pay, bringing their remuneration to a 12s. per week advance on pre-war rates; while the Corporation offered a 10s. advance. The Beverley Town Council have accepted a recommendation by the Gas Committee that an increase of 2s. in the war bonus to all classes of workmen in the Gas Department be granted, in response to an application by the men.

The Liverpool Gas Company have declared an interim half-yearly dividend of 2½ p.ct.

The Order in Council exempting trinitrotoluol from certain provisions of the Explosive Act, 1875, has been revoked.

The employees of Messrs. J. & W. B. Smith, Ltd., of Farringdon Road, have been granted a further war bonus of 3s. per week.

Stewarts and Lloyds, Ltd., interim half-yearly dividend on their preferred ordinary shares is announced at rate of 10 p.ct. per annum, payable on the 31st inst.

The Taunton Gas Company attributes a decrease of 5 million c.ft. in gas consumption during the past year to the lighting restrictions and the Summer Time Act.

At a meeting of the Greenock Gas Committee, it was intimated that the surplus for the undertaking in the past financial year was £5000, against an estimated amount of £1300.

Mr. W. H. Ellis, a Director of Messrs. John Brown & Co., Ltd., was last Tuesday elected Master Cutler of Sheffield for the fourth year in succession. He is the first master to hold office for that period.

It has been reported to the Oldham Gas Committee that an experiment with a gas-driven Ford car has been very satisfactory. The cost of running worked out at from 3 to 4 miles for 1d. One member remarked that, for an equivalent cost, they could get four times as much use as with petrol.

At the half-yearly meeting of the Normanton Gas Company last Saturday week, it was reported that the profits for the half year to June 30 amounted to £1567; the amount available for dividend being £4198. A dividend was declared at 6 p.ct. on the original stock, and 4½ p.ct. on the additional stock.

A suggestion has been made by Mr. C. Markham, of Chesterfield, for the erection after the war of a large power station adjacent to the South Yorkshire coalfield. The scheme is outlined in connection with a proposal to form a Joint Board for sewage, water, gas, and electricity for Sheffield, Rotherham, and Chesterfield.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

Lady for Charge of Show-Room. No. 6342.
Deputy Engineer and Manager Ormskirk Gas and Electricity Company. Application by Aug. 31.
Chemist. No. 6336.
Chemist-Engineer. No. 6338.
Mechanic. Kettering Gas-Works.
Works Foreman. Newport (Salop) Gas Company. Applications by Sept. 1.

Appointments, &c., Vacant (*continued*)—

Clerk and Weighing-Machine Attendant. Aldershot Gas, &c., Company.
Gas Fitter. Halesworth Gas Company.
Skilled Labourer. Chiltern Hills Spring Water Company, Aylesbury.
Stokers. Carnforth Gas Company.
Stokers. Ormskirk Gas and Electricity Company.
Stokers and Firemen. Watford Gas-Works.

Appointments Wanted.

Gas-Fitter. No. 6341.
Accountant, Cashier, or Secretary. No. 6343.
Working Gas Manager. No. 6340.

Plant Required.

Suction Gas Producer Plants. No. 6339.

Tank Wagons for Hire.—No. 6333.

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No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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See illustrated Advertisement Feb. 20, p. III. of Centre.

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